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Do peer and parental norms influence media content-induced cyber aggression?

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ABSTRACT

Evidence from previous research indicates that media exposure can contribute to the development of aggressive behaviors, even in online contexts. However, media effects are known to depend on various dispositional, developmental, and contextual factors. The present study investigates in a longitudinal perspective whether social norms deriving from both parents and peers can reinforce or mitigate the impact of exposure to media content on cyber aggression. A multilevel model for change is applied to data resulting from four waves (six-months intervals) of a Swiss longitudinal survey involving 101 randomly selected middle school classes (N = 1459, M_{age} at T1 = 11.53, SD = 0.41). Results show that a more frequent exposure to antisocial media content is significantly associated with higher rates of individual cyber aggression and that peer behavior (collective descriptive norm) significantly moderates this relation. No significant interaction effects with media exposure were found for perceived injunctive norms of peers and parents.

1. Introduction

Research about exposure to media violence dates back to the early days of television: the concern that the repeated viewing of violent scenes might translate into real-life aggression has motivated hundreds of studies since the early 1960s (Huesmann, 2007). Special attention has been devoted to the effects on children and adolescents because behaviors, thoughts and feelings maturing in younger age have the potential to consolidate and persist over adulthood (Bushman & Huesmann, 2006; Hummer, 2015). Particularly, the enduring impact of exposure to media violence on youth's aggressive behavior is mainly expected to be a consequence of observational learning: through the repeated viewing of others behaving violently, children can learn social scripts and schemas that support and promote aggression (Bushman & Huesmann, 2006; Huesmann, 2007). Media contents therefore acts as an extension of the social environment in which youth grow up, so that the formation of their personality and behavior is not only determined by experiences and role models in real life, but also by virtual ones.

Interestingly, with the spread of Internet and communication technologies, in the last decades not only children's media exposure has considerably increased, but its consequences have emerged also in online contexts. Findings from previous studies indeed show that exposure to media violence and antisocial behaviors is linked to increased risk for cyber aggression (den Hamer et al., 2014; den Hamer & Konijn, 2015; Fanti et al., 2012; Lam et al., 2013). This phenomenon has serious implications, as results from longitudinal studies show that the consequences of online aggression can be severe and long-lasting. Particularly, victims of cyberbullying and cyber aggression consistently report higher levels of anxiety, depression, and suicidal thoughts (Camerini et al., 2020; Hinduja & Patchin, 2010). In addition, both cyberbullying perpetration and victimization are related with interpersonal peer aggression and conduct problems at school (Camerini et al., 2020).

To successfully prevent online aggressive behaviors, it is essential to understand under which circumstances exposure to antisocial media content affects individual conduct. Because different persons are differentially susceptible to media effects (Valkenburg et al., 2016) studies on aggression should specify why, when, and for whom media effects happen (Prescott et al., 2018).

The present longitudinal study builds on the Differential Susceptibility to Media-effects Model (DSMM, Valkenburg & Peter, 2013) and theory of social norms, investigating the role that peer and parental norms play in the relationship between exposure to antisocial media content and online aggression. Particularly, the research explores the trajectories of online aggression during early adolescence, a life period characterized by important changes in media consumption, aggressive

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conduct, and susceptibility to social pressure.

1.1. Exposure to antisocial media content in early adolescence

Early adolescence represents a particularly critical phase in terms of exposure to antisocial media content, as some of the many transformations that take place during this developmental period have the potential to increase the risk of being confronted with violent or antisocial content. One of the first causes of this increased risk is the growth of media consumption and especially of Internet: although in most wealthy countries Internet use has become rather common even among young children, it is with the beginning of adolescence that the frequency of online activities increases exponentially. This rise is mostly due to the fact that the first Smartphone is typically received around this time: in Switzerland, the average age at which children get their own personal device is 10 years (Waller et al., 2019) and, by the age of 12–13, only 3% of kids do not yet have one (Suter et al., 2018). Ownership of a personal device allows for a greater freedom in media consumption: over 90% of those who have their own Smartphone report using it every day, and the most common activities include chatting, surfing the Internet, using social networks, and watching videos (Suter et al., 2018). This condition exposes children to a greater variety of contents and, consequently, also to a higher risk of encountering representations of violence and other antisocial behaviors.

A second important risk factor for greater exposure to violent content during early adolescence is reduced parental control. Monitoring children's activities indeed becomes significantly more challenging when Smartphones are involved: while a quick glance at the TV or PC is usually enough to evaluate the appropriateness of a movie or video game, the portability and smaller screen of mobile phones makes this task much more difficult (Blackwell et al., 2016). In addition, Smartphones are potentially always connected to the Internet and their use is spread over the course of the whole day, characteristics that interfere with parental surveillance (Blackwell et al., 2016). It should also be considered that with entrance into adolescence, kids experience an increased desire for privacy, and parents usually become more willing to grant it. Indeed, while there are numerous parental control apps to limit Internet use and block unwanted content, their use remains quite limited: according to research conducted in 2016 (Anderson), only 16% of parents reported using parental control apps to monitor and restrict online activities on their teens' mobile phone. This low adoption rate reflects the propensity of parents to grant more autonomy to their children (Ghosh et al., 2018).

Finally, although exposure to media violence can be accidental, it becomes increasingly intentional as children grow older. Particularly, with entrance into adolescence, media violence become increasingly appealing to children, as this type of content can satisfy the search for strong emotions and the willingness to transgress that are typical of this age (Kirsh, 2003). Novelty and sensation seeking are indeed known to dramatically increase with the onset of puberty (Steinberg, 2004): this translates into a higher vulnerability to risky behaviors but also to a higher interest in media content that portrays violence and antisocial conduct (Kirsh, 2003). Therefore, during early adolescence, the risk of exposure to antisocial media content does not increase solely because of more frequent and less controlled media use, but also because children become increasingly attracted by this type of depiction.

Because in the last sixty years a countless number of studies has provided evidence for the association between exposure to media violence and youth aggression (Anderson et al., 2010; Bender, Plante, & Gentile, 2018; Furlow, 2017), it is clear that the consequences of these changes in media consumption can be highly problematic.

1.2. The normative influence of parents and peers

Although exposure to antisocial media content might affect youth aggressive behavior through mechanisms of social learning, it is important to acknowledge that early adolescents are confronted also with other important role models. Particularly, both peers and parents are known to be key figures in the socialization of children and adolescents (Horstman et al., 2016; Veenstra & Dijkstra, 2011), and their normative influence should therefore be considered a key determinant of youth misbehavior.

According to the Focus Theory of Normative Conduct (Cialdini et al., 1990), individual conduct can be affected by what most others do and what most others approve or disapprove (descriptive and injunctive norms, respectively). Findings from research on youth aggression support this theory, showing that peer and parental norms have a significant impact on children and adolescents' engagement in such behavior. More specifically, it has been demonstrated that children and early adolescents who perceive that aggressive behaviors are frequent and approved in their peer group, are also more likely to perpetrate them (Bushing & Krahé, 2015; Espelage et al., 2003; Henry et al., 2000; Werner & Hill, 2010). Similarly, perceived high rates of parental conflict have been found associated with increased rates of children's aggression (Piotrowski et al., 2017; Vu et al., 2016), while perceptions of parental sanctions and disapproval of aggression have been found to prevent child aggressive behaviors (Hinduja & Patchin, 2013; Orpinas et al., 1999; Pabian & Vandebosch, 2013). Then, while many studies have focused on *perceptions* of others' behavior and behavioral expectations (i.e., perceived norms), it is important to mention that also the *actual* behavioral prevalence and approval of others (i.e., collective norms) can shape individual behavior (Geber et al., 2019). For instance, engagement in aggressive behaviors such as bullying and fighting appears to be more frequent among adolescents with more aggressive friends (Espelage et al., 2003).

Interestingly, besides affecting adolescents' aggressive behavior, peer and parental norms can also stimulate or inhibit their exposure to media content. Peer norms that support aggression might indeed increase the likelihood of watching or sharing violent videos and images. For instance, adolescents may choose to watch the same violent TV series as their friends to avoid being excluded from the group. On the contrary, parents who strongly disapprove of aggression could also establish explicit rules that prohibit their children from watching violent programs or playing violent videogames. Although in the latter case the intent is clearly to reduce exposure to problematic content, it should be noted that parental restriction might also backfire: this type of ban can indeed produce a "forbidden fruit effect" and make violent contents even more attractive to the eyes of children (Bijvank et al., 2009).

1.3. The DSMM and social norms

Because of their association with aggression and media exposure, both peer and parental norms might influence the relation between these two. This hypothetical interacting role can be illustrated by integrating theory of social norms with the Differential Susceptibility to Media-effects Model (DSMM, Valkenburg & Peter, 2013).

The DSMM is a theoretical model that aims at explaining why certain individuals are more susceptible to media effects than others. The DSMM synthesizes and extends the insights of earlier media effects theories that describe how the impact of media is contingent on several personal and social context factors (e.g., Social Cognitive Theory by Bandura, 2001; General Aggression Model by Allen et al., 2018). Particularly, the model consists of four different propositions: (1) media effects are conditional, (2) media effects are indirect, (3) the differential-susceptibility variables have multiple roles, and (4) media effects are transactional (Valkenburg & Peter, 2013). The first proposition – which posits that susceptibility to media effects depend on a variety of dispositional, developmental, and social variables – is of particular importance for the present study. Indeed, it implies that not all children and adolescents who are frequently exposed to antisocial media content will necessarily experience an increase in aggressive behaviors, helping to explain why results from meta-analyses of media

violence effects typically reveal only small to moderate effect sizes (Anderson et al., 2010; Bushman & Huesmann, 2006; Ferguson & Kilburn, 2009).

Among the most important social-context factors that can explain differences in children and adolescents' susceptibility to the effects of violent and antisocial media exposure, there are peer and parental norms. Indeed, past applications of the DSMM suggest that both family and peers have an important role in shaping the effects of early adolescents' media use on aggression. For instance, results from a two-wave study (Fikkers et al., 2013) showed that the impact of higher media violence exposure on subsequent aggression was stronger for those adolescents (aged 10–14) who reported higher levels of family conflict. Then, in a further two-wave study conducted among early adolescents (Fikkers et al., 2015), the authors found that the effect of media violence on aggression was mediated by peer approval of aggression and moderated by perceived prevalence of peer aggression. Their study does not only suggest that peer norms can significantly influence the media violence-aggression relation, but also that it is possible to find significant differences according to the type of norm (e.g., descriptive vs. injunctive). In light of these findings, it was recommended that researchers focus more on what happens when media messages do or do not converge with the norms deriving from adolescents' social environment (Fikkers et al., 2015).

2. The current study

2.1. Media and normative effects on cyber aggression

The widespread use of communication technologies that marks entrance into early adolescence does not only imply better chances of being exposed to problematic media content, but also permits the occurrence of a relatively new form of aggressiveness: cyber aggression. Because of its negative consequences on youth wellbeing (Camerini et al., 2020), cyber aggression – defined as the intentional behavior aimed at harming others by using computers, cell phones, and other electronic devices (Schoffstall & Cohen, 2011) – has received high research attention in the last decade. Interestingly, findings from this body of research indicate that the relation between media exposure and aggression exists even in online settings, so that youth that are more frequently exposed to violent and antisocial media content are more likely to perpetrate acts of cyber aggression and cyberbullying (Camerini et al., 2020; Kowalski et al., 2014).

Moreover, previous research has demonstrated that online aggression is also related to peer and parental norms. For instance, Dang and Liu (2020) have found that class norms supporting cyberbullying increased the likelihood that adolescents would engage in such behavior, while results reported by Bastiaensens et al. (2015) indicate that those adolescents who perceived their friends to be supportive of cyber aggression were also more likely to join cyberbullying. Similarly, Pabian and Vandebosch (2013) found that peer approval and parental tolerance of aggression significantly contribute to predict child aggressive behavior.

Despite this evidence, no study (to the best of our knowledge) has yet investigated the phenomenon of cyber aggression by considering the concurrent and interacting effects of media exposure and social norms deriving from parents and peers. Particularly, although a couple of studies (Fikkers et al., 2013, 2015) suggest that peer and parental norms that promote aggression might reinforce the impact of media violence on traditional forms of peer aggression, it is important to consider that the nature of online interactions might change individuals' subjectivity to normative influence. For example, the possibility to act anonymously might promote disinhibition (Suler, 2004) and reduce the willingness to comply with the behavior and the expectancies of others (Rimal et al., 2011). Conversely, because these environments are particularly conducive to the development of social groups characterized by similar-minded members and shared identities (Sirola et al., 2021), the role played by social norms might be even stronger. Indeed, when individuals feel a strong sense of identification with a group, they are more likely to follow its norms (Lapinski & Rimal, 2005).

2.2. A longitudinal perspective

As previously discussed, early adolescence is an especially critical period for studying media effects, as the exposure to antisocial content is significantly increased by heightened media use, decreased parental control, and greater interest in portrayal of violence and antisocial behaviors. It should however be acknowledged that entrance into adolescence is characterized by important transformations also with regard to cyber aggression and social norms. Indeed, acts of online aggression have been reported to become more frequent with the passage from childhood to adolescence (Khan et al., 2020; Williams & Guerra, 2007) and to further increase throughout adolescent years, peaking in early adulthood (Barlett & Chamberlin, 2017). In addition, research on social norms indicates that susceptibility to normative influences varies across childhood and adolescence. Particularly, children are typically more likely to comply to norms deriving from adults, while young adolescents are particularly sensitive to peer pressure (Knoll et al., 2015). Indeed, peer influence has been reported to rise from late childhood and to peak around the age of 14 (Brown & Anistranski, 2020). To investigate the effects of media exposure and social norms on cyber aggression it is therefore essential to adopt a longitudinal perspective that takes into consideration the changes that occur in relation to each of these variables.

2.3. Aim and hypotheses

Based on these considerations, the aim of the present study is to examine in a longitudinal perspective whether social norms deriving from both parents and peers can reinforce or mitigate the impact of exposure to media content on cyber aggression. The first set of hypotheses (H1-H4) tests the main effect of exposure to antisocial media content and social norms. These hypotheses aim to verify whether findings from previous research apply to our sample. Particularly, because exposure to antisocial media has been linked to aggressive conduct in both offline and online contexts, we hypothesized:

H1. Early adolescents who are more frequently exposed to antisocial media content will be more likely to commit cyber aggression over time.

In addition, because research on social norms states that children's and adolescents' aggressive behaviors are subject to the influence of both parents and peers, we also predicted that:

H2. Early adolescents whose peers engage more often in acts of online aggression (collective peer descriptive norm) will be more likely to commit cyber aggression over time.

H3. Early adolescents who perceive that their peers are more approving of aggressive behaviors (perceived peer injunctive norm) will be more likely to commit cyber aggression over time.

H4. Early adolescents who perceive that their parents are more tolerant of aggressive behaviors (perceived parental injunctive norm) will be more likely to commit cyber aggression over time.

Then, the second set of hypotheses (H5-H7) investigates the existence of an interaction effect between the exposure to antisocial media content and social norms. According to the first proposition of the DSMM, media effects are indeed conditional and depend on various differential-susceptibility variables, including important social factors such as parents and peers (Valkenburg & Peter, 2013). What we expect is that pro-aggression normative messages from parents and peers will reinforce the effect of exposure to antisocial content. Specifically, we hypothesized:

H5. The relation between exposure to antisocial media content and

increased cyber aggression will be stronger for early adolescents whose peers engage more often in acts of online aggression (collective peer descriptive norm).

H6. The relation between exposure to antisocial media content and increased cyber aggression will be stronger for early adolescents whose peers are more approving of aggression (perceived peer injunctive norm).

H7. The relation between exposure to antisocial media content and increased cyber aggression will be stronger for early adolescents whose parents are more tolerant of aggression (perceived parental injunctive norm).

3. Method

3.1. Participants and procedure

Data for the present research are drawn from a longitudinal survey on risky behaviors conducted in the Canton of Ticino, Switzerland. The survey, approved by the local school authorities, involves a representative sample of the early adolescent population of the Canton, which is considered one of the most prosperous regions of Switzerland and Europe (Baechler, 2017). The region is characterized by few densely populated urban centers and various valleys of a rural nature and, according to recent school statistics, 75% of middle school students are Swiss, 13% Italian and less than 10% come from other European countries (DECS, 2019). The sample includes 101 classes (100 from public schools and 1 from the private school). Classes from public schools were randomly selected so to represent 66% of all first-year public school classes in the five areas of the Canton. In addition, an invitation to participate in the study was sent also to three private schools (i.e., those having more than two first-year classes). One of the private schools accepted the invitation and one of its two first-year classes was randomly selected to participate. For the present study, we used data collected at six-months intervals during the first two years of middle school: Fall 2017 (t1), Spring 2018 (t2), Fall 2018 (t3), Spring 2019 (t4). The observation time ranged from the beginning of the first year of middle school till the end of the second year ($M_{age} = 12.28$, $SD = 0.69$; $Min_{age\ T1} = 10.7$, $Max_{ageT4} = 15.44$). A total of 2052 students were invited to participate at T1. Of these, 2022 participated at t1, 1879 at t2, 1896 at t3 and 1865 at t4. In addition to authorization from the cantonal school authorities, parents of the students were informed about the study and about the possibility to exclude their children (passive consent). Less than 4% of the students ($N = 75$) did not participate because their parents objected. The remaining missing data are due to absences the day of data collection or students moving outside the Canton. On all occasions, data were collected through self-administered paper--and-pencil questionnaires during school hours. Teachers were instructed to administer the questionnaires, to insert all completed questionnaires in an envelope and to seal it in front of the students (so to protect participants' privacy). To match data from the four waves, questionnaires were provided with a unique identifier associated with the student's name to which only collaborating school staff had access for survey distribution purposes.

3.2. Measures

3.2.1. Cyber aggression

To measure cyber aggression perpetration, we selected 6 items from the European Cyberbullying Intervention Project Questionnaire (ECIPQ; Del Rey et al., 2015) and we asked participants to report how often they had engaged in these actions in the previous six months, using a 4-point response scale that went from "Never" (1) to "Often" (4). The selected items covered verbal aggression ("I said nasty things to someone or called them names using texts or online messages", "I threatened someone through texts or online messages"), relational aggression ("I said nasty things about someone to other people either online or through text messages", "I spread rumors about someone on the Internet", "I excluded or ignored someone in a social networking site or Internet chatroom") and media-related aggression ("I posted embarrassing videos or pictures of someone online"). We discarded 5 items from the original scale: these excluded items concerned hacking skills, creating fake accounts, altering pictures/videos of others, or posting online personal information about someone. Cronbach's alpha for the selected items was 0.743 at t1, 0.825 at t2, 0.839 at t3 and 0.852 at t4. Reliability of the online aggression was tested employing several measurement invariance models. Details and results are reported in Appendix A.

3.2.2. Exposure to antisocial media content

Exposure to antisocial media content was measured using 6 items from the Content-based Media Exposure (C-ME) scale (den Hamer et al., 2017). The original scale includes 8 items that measure exposure to media with antisocial and risk behavior content, and 9 neutral filler items. For the present study we considered only items that address antisocial and risky behavior, in particular fighting, use of drugs, destruction of someone else's belongings, shooting, alcohol consumption and theft. The two items about sex (i.e., open talk about sex and having sex) were not included. Participants were asked to report how often they see these actions on their phone, on the Internet, on TV or in videogames, using a 5-point scale that ranged from "never" to "very often". Cronbach's alpha was .891 at t1, 0.915 at t2, 0.926 at t3 and 0.928 at t4.

3.2.3. Peer and parent norms

In the present study we assessed peer descriptive and injunctive norms as well as parental injunctive norms. Particularly, we measured the descriptive norm of peers at the group level (collective norm), while the injunctive norm of peer and parents at the individual level (perceived norm). Because it has been suggested that the aggregation of individuals' behaviors can serve as a proxy for collective norms (Rimal & Lapinski, 2015), to measure the descriptive norm of peers we calculated a mean score of self-reported cyber aggression for each class. This measurement allows to determine whether individuals are more or less exposed to acts of cyber aggression. To measure peer and parental injunctive norms, we asked participants to evaluate how both these referent figures would react if they engaged in aggressive behaviors towards a schoolmate. This type of norms is indeed commonly assessed by asking people to indicate how much other important individuals or group are expected to react to a particular behavior (e.g. Compernolle, 2017; Joyal-Desmarais et al., 2019; Shin et al., 2015). More specifically, we used four indicators for peer injunctive norms and four for parental injunctive norms. In both cases the four items covered acts of traditional aggression (i.e., in-person insults and kicking or hitting) and of online aggression (i.e., insults via communication technologies and sharing embarrassing pictures or videos). Answers were provided using a 6-point smiley face scale that went from an angry/sad face (1 = complete disapproval) to a happy face (6 = complete approval). Cronbach's alpha for the items about peer norms was 0.895 at t1, 0.881 at t2, 0.925 at t3 and 0.908 at t4. Cronbach's alpha for the four items about parental norms was 0.801 at t1, 0.837 at t2, 0.841 at t3 and 0.904 at t4.

3.2.4. Age

The age of participants at each wave was calculated from participants' birthdate.

3.2.5. Internet access

To get an overview of the sample's use of Internet and media, participants were asked if they owned a cell phone or another device with Internet access (computer or tablet).

3.3. Data analysis

To conduct our longitudinal analyses, we used data obtained from those subjects who participated in all four waves (n = 1459, 71% of initial sample). Missing data related to the variables of interest (cyber aggression, media content exposure and social norms) were rather limited (<2.7%) in each wave. According to the standards described by Tabachnick and Fidell (2007), rates below 5% are acceptable and estimation of missing data is not necessary, so we did not use any imputation method. To examine the trajectories of online aggression we used growth models, within a multilevel modeling approach (cf. Singer & Willet, 2003) which allows to investigate both within-person (Level 1) and between-person (Level 2) changes. Level 1 concerns the individual change in rates of online aggression that each adolescent is expected to experience during the period of the study (2 years), while Level 2 refers to changes due to those influence factors that are similar for group of subjects in a sample (i.e., social norms). The two-level hierarchical models were estimated using a Maximum Likelihood method in SPSS Statistics 25. As a first step of our analysis, we calculated an unconditional mean model, which estimates both a fixed effect – the grand mean of the dependent variable score across all individuals and all waves – and a random effect. This first model indicates whether there is systematic variation worth exploring and how much of this variability is due to between-person differences and how much lies within individuals. In our specific case the analysis shows that there are significant differences in rates cyber aggression, both between and within subjects. Our second step was therefore to calculate an unconditional growth model, which adds the parameter of time as a predictor of change. As a time factor, we considered the exact age of participants, calculated from their birthdate and the dates of data collection. From the age we subtracted 11 (the age of most participants at t1) to make the intercept more meaningful. The unconditional growth model indicates how much of the variance within and between subjects can be attributed to the ageing of participants and provides a baseline that permits to evaluate the contribution of further predictors. Specifically, we continued the analysis by adding as predictors of both initial status and rate of change the different types of social norms, first those deriving from peers (collective descriptive norm and perceived injunctive norm), then those deriving from parents (perceived injunctive norm). Finally, we included the interaction effects between exposure to antisocial media content and the three types of social norms. To make the interpretation of parameter estimates easier, all predicting variables were mean centered. In all models the intercept represents each subjects' average level of cyber aggression, while the coefficient on time represents the six-month increase.

4. Results

The 1459 subjects who participated in all four waves (71% of subjects invited to participate in the study at t1) had a mean age of 11.53 ($SD = 0.41$) at t1 and 13.03 ($SD = 0.41$) at t4. About 48% of the sample is female. At t1, about 70% of participants reported owning a personal device with Internet access (mobile phone, computer, or tablet). This percentage reaches 85% at t4. The descriptive statistics for exposure to antisocial media content, cyber aggression and social norms are displayed in Table 1, while correlations among these variables are reported in Appendix B. In Table 1 it can be noted that rates of exposure to antisocial media content, cyber aggression and collective descriptive norms tend to increase over time, although following a slightly swinging trend. Conversely, the perceived peer approval of aggression (injunctive norm) tends to increase. For what concerns parental injunctive norms, a similar decreasing pattern cannot be observed. The significance of changes in means across the four waves are reported in Appendix C.

The results of growth models predicting cyber aggression are reported in Table 2, while Table 3 shows the Goodness of fit. With respect to the latter, we can see that with the addition of media exposure and social norms as predicting variables, the fit with the observed data progressively improves. Then, the variance components reported in Table 2 show that starting from the unconditional growth model, the between-subjects variance relative to the initial status is no longer significant, meaning that, at least for the initial status, there are no significant differences in levels of cyber aggression to be explained. This also implies that different levels of exposure to antisocial media content as well as normative influences cannot be considered responsible for significant differences between individuals in initial levels of cyber aggression. Results from our final model (Table 2) allows to test our hypotheses.

Table 1
Descriptive Statistics: Longitudinal assessment of injunctive and descriptive norms on peer aggression.

	Waves			
	t1	t2	t3	t4
Antisocial media content exposure				
N	1445	1444	1438	1447
Mean (SE)	1.61 (0.02)	2.07 (0.03)	1.99 (0.03)	2.45 (0.03)
Skewness (SE)	1.72 (0.06)	0.90 (0.06)	1.06 (0.07)	0.49 (0.06)
Kurtosis (SE)	2.74 (0.13)	−0.11 (0.13)	0.19 (0.13)	−0.73 (0.13)
Cyber aggression				
N	1443	1442	1434	1445
Mean (SE)	1.11 (0.01)	1.21 (0.01)	1.18 (0.01)	1.27 (0.01)
Skewness (SE)	4.64 (0.06)	2.98 (0.06)	3.98 (0.07)	2.57 (0.06)
Kurtosis (SE)	31.99 (0.13)	11.71 (0.13)	20.93 (0.13)	7.96 (0.13)
Descriptive peer norms				
N	1459	1459	1459	1459
Mean (SE)	1.11 (0.002)	1.22 (0.003)	1.18 (0.003)	1.27 (0.004)
Skewness (SE)	0.81 (0.06)	1.18 (0.06)	0.66 (0.06)	0.97 (0.06)
Kurtosis (SE)	0.67 (0.13)	1.50 (0.13)	0.54 (0.13)	1.76 (0.13)
Injunctive peer norms				
N	1446	1452	1445	1448
Mean (SE)	2.27 (0.03)	2.30 (0.03)	2.43 (0.03)	2.59 (0.03)
Skewness (SE)	0.97 (0.06)	1.13 (0.06)	1.06 (0.06)	0.95 (0.08)
Kurtosis (SE)	1.10 (0.13)	1.82 (0.13)	1.43 (0.13)	1.33 (0.13)
Injunctive parental norms				
N	1452	1454	1453	1450
Mean (SE)	1.60 (0.02)	1.43 (0.02)	1.63 (0.02)	1.51 (0.02)
Skewness (SE)	1.07 (0.06)	2.23 (0.06)	1.98 (0.06)	2.25 (0.06)
Kurtosis (SE)	1.73 (0.13)	8.81 (0.13)	7.84 (0.13)	8.00 (0.13)

4.1. Exposure to antisocial media content

Our first hypothesis was that the frequency of exposure to antisocial media content would be associated with higher levels of cyber aggression over time (H1). Results from our final model confirm this hypothesis, both for the initial status and the rate of change. Indeed, subjects' average level of cyber aggression results to be significantly higher when a more frequent exposure to antisocial media content is reported (0.035, $SE = 0.008$), as is the speed of growth over time. Particularly, the estimate of cyber aggression results slightly increased by additional 0.016 ($SE = 0.006$) points every six months.

4.2. Descriptive norm of peers

Our second hypothesis predicted that peer collective descriptive norms are positively associated with individual levels of cyber aggression (H2). Results from our growth models confirm that students who attend a class where acts of cyber aggression are more frequent are significantly more likely to engage in online aggressive behaviors 0.795 ($SE = 0.040$). However, the descriptive norm of peers does not have a significant impact on the rate of change, meaning that the increase in one's self-reported online aggression is the same regardless of the level of classmates' self-reported online aggression. For what concerns the interaction of peer descriptive norms with media exposure, we hypothesized (H5) that the aggressive behavior of peers would have reinforced the association between exposure to antisocial media content and cyber aggression. Also in this case our analysis shows significant

Table 2
Results of fitting a multilevel model for change to the cyber aggression data: fixed effects and variance components.

		Model A	Model B	Model C	Model D	Model E	Model F	Final model
Fixed Effects								
Initial status	Intercept	1.193*** (0.007)	1.083*** (0.008)	1.083*** (0.008)	1.083*** (0.008)	1.083*** (0.008)	1.084*** (0.008)	1.083*** (0.008)
	EAMC			0.041*** (0.008)	0.035*** (0.008)	0.036*** (0.008)	0.033*** (0.008)	0.035*** (0.008)
	Peer DN				0.684*** (0.082)	0.693*** (0.081)	0.714*** (0.079)	0.795*** (0.040)
	Peer IN				0.031*** (0.008)	0.026** (0.008)	0.025** (0.008)	0.025*** (0.004)
	Parental IN					0.030* (0.013)	0.036** (0.013)	0.030* (0.013)
	EAMCxPeer DN						0.363*** (0.074)	0.388*** (0.033)
	EAMCxPeer IN						0.010 ns (0.007)	
	EAMCxParental IN						0.003 ns (0.013)	
Rate of change	Intercept		0.086*** (0.007)	0.085*** (0.007)	0.087*** (0.006)	0.087*** (0.006)	0.076*** (0.006)	0.083*** (0.006)
	EAMC			0.031*** (0.006)	0.024*** (0.006)	0.017** (0.006)	0.015** (0.006)	0.016** (0.006)
	Peer DN				0.130* (0.047)	0.091 ns (0.053)	0.057 ns (0.052)	
	Peer IN				0.009 ns (0.006)	0.000 ns (0.006)	−0.003 ns (0.006)	
	Parental IN					0.054*** (0.009)	0.035*** (0.001)	0.051*** (0.009)
	EAMCxPeer DN						−0.013 ns (0.046)	
	EAMCxPeer IN						0.004 ns (0.005)	
	EAMCxParental DN						0.015 ns (0.008)	
Variance Components								
Level 1	Within-person	0.093*** (0.002)	0.069*** (0.002)	0.067*** (0.001)	0.061*** (0.001)	0.058*** (0.001)	0.056*** (0.001)	0.057*** (0.001)
Level 2	In initial status	0.056*** (0.003)	0.006 ns (0.004)	0.004 ns (0.000)	0.003 ns (0.000)	0.003 ns (0.000)	0.003 ns (0.000)	0.003 ns (0.000)
	In rate of change		0.020*** (0.003)	0.017*** (0.002)	0.015*** (0.002)	0.014*** (0.002)	0.013*** (0.002)	0.013*** (0.002)
	Co-variance		0.011*** (0.003)	0.008*** (0.002)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)

Note: Cells show the estimates and their standard deviations in brackets. EAMC: exposure to antisocial media content, DN: descriptive norm; IN: injunctive norm.

Table 3
Results of fitting a multilevel model for change to the injunctive norm data: Goodness of fit.

	Model A	Model B	Model C	Model D	Model E	Model F	Final model
Deviance	4460.25	3807.63	3373.75	2882.39	2711.52	2542.57	2589.94
AIC	4466.25	3819.63	3389.75	2906.39	2739.52	2582.57	2615.94
BIC	4486.23	3859.39	3442.71	2985.78	2832.11	2714.84	2701.91

results only for what concerns the initial state (0.388, $SE = 0.03$). This means that antisocial media content is more likely to affect individual cyber aggressive behavior when subjects are exposed to peers who report being more aggressive.

4.3. Injunctive norm of peers

The third hypotheses predicted that peer injunctive norms are positively associated with individual levels of cyber aggression (H3). Results from our analyses confirm that participants who perceived higher levels of aggression disapproval display significantly lower levels of cyber aggression (0.025, $SE = 0.004$). However, as in the case of peer descriptive norms, our analysis did not show a significant impact on the rate of change. This means that the increase over time in cyber aggression remains the same regardless of levels of perceived peer tolerance. Regarding the interaction effect with media exposure (H6), we did not find any significant result, meaning that peer injunctive norms do not strengthen the association between exposure to antisocial media content and cyber aggression. Therefore, our sixth hypothesis cannot be confirmed.

4.4. Injunctive norm of parents

Finally, we included two hypotheses regarding the role of parental injunctive norms. First, we hypothesized that they are positively associated with individual levels of cyber aggression (H4). Results from our growth models confirm that subjects reporting that their parents are more tolerant of aggression are more likely to perpetrate cyber aggression (0.030, $SE = 0.013$). In addition, our findings show that higher levels of parental tolerance are also associated with a steeper increase in aggressive behaviors (0.051 points every six months, $SE = 0.009$). This means that the increase in cyber aggression is faster when parental norms are more condoning of aggression.

As in the case of peer injunctive norms, the interaction with exposure to antisocial media content was not significant, neither for the initial state, nor for the rate of change.

5. Discussion

Because children today grow up in a society increasingly pervaded by media, their likelihood of being exposed to antisocial content has increased. Gaining a better understanding of how this type of content might impact youths' behavior has therefore become more important than ever.

Although decades of research have supported the relationship between media violence and aggression, results from meta-analyses show rather small effect-sizes (Anderson et al., 2010; Bushman & Huesmann, 2006; Ferguson & Kilburn, 2009). These findings contribute to the theory that media effects are not absolute but depend on multiple individual factors.

The present study aimed at verifying how social norms deriving from two of the most important referent figures in early adolescence (i.e., parents and peers) might affect the longitudinal association between exposure to antisocial media content and aggressive behaviors in online settings.

In line with past research about the development of cyber aggression results from our study show that over time the engagement in such behavior tends to increase. Indeed, according to recent research, engagement in online aggressive behaviors such as cyberbullying grows until the mid-twenties (Barlett & Chamberlin, 2017). In addition, we found that this increase is significantly associated with frequent exposure to antisocial media contents. As suggested by previous longitudinal studies (Fanti et al., 2012; den Hamer & Konijn, 2015), this result confirms that media effects can take place even in virtual environments. It is however important to note the impact found was rather small, both as regards the initial status and the rate of change. While this finding might be explained by the low rates of aggression reported by our sample, our results reveal that social norms about aggression also significantly contribute to shape individual trajectories of cyber aggression.

Particularly, for what concerns the norms deriving from peers, we found that both collective descriptive norms and perceived injunctive norms have a significant impact on the engagement in online aggression. The effect of collective descriptive norms is especially strong, meaning that early adolescents tend to behave according to their peers' behavior. This result is interesting because online aggression is a behavior that can potentially be perpetrated without people knowing, as the victim could be targeted through private channels. Despite this, our results suggest that somehow a greater diffusion of this behavior in one's environment can influence individual conduct. This could mean that the more visible acts of cyber aggression (e.g., sharing embarrassing pictures of someone in public online environment) are sufficient to establish a behavioral norm. An explanation for this phenomenon might be related to the fact that, although frequented, the cyberspace remains a territory with unclear borders, where understanding the most appropriate conduct is not always so obvious. Because in situations of ambiguity individuals are known to be more likely to engage in social comparison with others (Abrams & Hogg, 1990), it is possible that in online settings children have high chances to imitate the behavior of others and therefore conform to social norms.

We further found that perceived injunctive norms of peers affect the individual engagement in online aggression, although in this case the effect is smaller. The direction of this effect is in line with findings from previous research on aggression (e.g., Bastiaensens et al., 2015; Bushing & Krahé, 2015) and other types of risky behaviors (e.g., Pedersen et al., 2017; Perkins et al., 2019): those children who perceive that their peers are more tolerant towards aggressive behaviors result to be more willing to adopt this behavior themselves. Conversely, when the perception is that peers would condemn this behavior, individuals report lower rates of this behavior.

Interestingly, between the two types of peer norms, only the descriptive one was found to moderate the relationship between antisocial media and cyber aggression. Indeed, our findings show that the impact of media exposure on rates of individual cyber aggression is significantly stronger for those subjects whose classmates were more engaged in acts of online aggression. Drawing from Cultivation Theory (Gerbner et al., 1980), this result can be interpreted as the result of a "double dose" of messages promoting aggression: when the latter are displayed by both media and peers, early adolescents are more likely to conform their behavior to these sources. The fact that peer injunctive norms do not moderate the association mirrors the results reported by Fikkers et al. (2015): in their study about media violence exposure and traditional aggression they failed to prove the moderating role of peer injunctive norms. However, what they found is that media violence is related to increased aggression via higher perceived approval of peer aggression and that this indirect effect is stronger for adolescents with higher perceived prevalence of peer aggression. In other words, their results suggest that peer injunctive norms might better serve a mediating function, instead of a moderating one. Nonetheless, it should be mentioned that their testing for a sole mediation hypothesis did not lead to significant results. In our case, the non-significant moderating effect of injunctive norms could be related to the effect of injunctive norms on aggressive behavior, which is smaller than that of descriptive norms. In turn, this may be due to the age of the sample. Indeed, previous research indicates that susceptibility to peer pressure reaches its maximum around the age of 14 (Brown & Anistranski, 2020). The fact that the present research found a modest impact of peer injunctive norms might therefore be explained by the focus on younger adolescents. It is therefore possible that their role becomes more incisive only in the following years.

For what concerns parental norms, in line with previous research about the key role that parents play with regard to risky behaviors (DeVore & Ginsburg, 2005), we found that they have a significant effect on cyber aggression. Particularly, early adolescents who perceived their parents to be more tolerant towards aggression were also more likely to engage in this behavior over time. Conversely, perceived parental disapproval of aggression was found to determine lower rates of this behavior and inhibited its development. This result is especially relevant because it indicates that parents have the possibility to slow down the increase in such problematic behavior. Although in the present study this effect was quite small, it is still interesting to note that, at least for what concerns the rate of change, the norm of parents prevailed on that of peers. Indeed, despite the fact that the importance attributed to peers is expected to increase as children grow out of childhood and enter adolescence (Brown, 2013) peer norms (both descriptive and injunctive) did not have a significant impact on the rate of change, meaning that peer norms that support aggression generally lead to higher rates of online aggressive behaviors, but they do not accelerate their increase. Again, this result could be explained by the young age of our sample: although early adolescents are known to become progressively more independent, parents continue to play a decisive role in the life of their children (DeVore & Ginsburg, 2005).

For what concerns the interaction of parental injunctive norms with media exposure, our analyses did not find any significant effect, neither for the initial state, nor for the rate of change. As in the case of peer

injunctive norms, this result might be related to the relatively small impact that parental norms have on cyber aggression. Because acts of online aggression can be committed while remaining anonymous, it can be hypothesized that the approval of others is less determinant of behavior: without the fear of social sanction, one might decide to commit aggression regardless of perceived peers' and parents' expectations. It should also be considered that in online environments there could be other referent figures that are more influential than parents and classmates. For instance, it would be interesting to verify whether perceived injunctive norms deriving from online friends or followers are more determinant of cyber aggression.

5.1. Limitations and future implications

A first limitation of the present study concerns the assessment of cyber aggression. As reported in the method section, our measure did not include all the original items of the ECIPQ scale (Del Rey et al., 2015). A shortened version was preferred because of space limitations and our analyses proved its reliability over time. Nonetheless, by excluding some items some dimensions of the scale (i.e., media-related violence) remain underrepresented. In addition, it was used a four-point scale, which is not very sensitive and might have interfered with the detection of changes. Moreover, low rates of cyber aggression might be due to a social desirability bias, as participants might be reluctant to report their engagement in what they probably consider an undesirable behavior. This bias might have affected even reports of social norms, especially those coming from their parents: children might want to put their parents in a positive light.

Non-response bias might represent a further limitation of the study: although the number of subjects being excluded on the basis of their parents' decision was rather limited, it could be that these non-responders differ in a meaningful way to responders. For instance, families refusing to participate in a school survey about risky behaviors might be especially sensitive to the topic, or they might have a problematic relation with the school administration. This could mean that excluded children might perceive different parental norms (stricter or more permissive), but also be more involved in problematic behaviors, including cyber aggression.

A further limitation concerns the measurement of collective descriptive norms, as we did not remove individual's own value when computing the mean score of self-reported cyber aggression for each class. However, because of the class sizes, we expect the bias in the calculated score to be minimal.

Then, it should also be mentioned that in the present study we did not explore the potential mediating role of social norms. In the present study we indeed hypothesized only a moderation effect, expecting that social norms supporting aggression would reinforce antisocial media messages and result in higher levels of individual aggression. However, it is important to note that the formation of social norms about the diffusion and approval of aggressive behavior could also be shaped by media content, so that those adolescents who watch more frequently scenes of antisocial conduct might end up with believing that this behavior is more common and acceptable than it is in reality. We therefore recommend that future studies investigate also the existence of a mediated path.

Then, while in this study we included two of the most important referent figures of early adolescence, it should be mentioned that at this age behavioral norms come also from school. Indeed, children and adolescents spend most of their day at school and, through school policies, rules, and teachers' behavior, this institution is expected to significantly shape the habits and values of students. Particularly, school authorities are in most cases very clear about the attitudes, beliefs and behaviors that students should (or should not) display toward each other (Nesdale & Lawson, 2011): aggressive behavior of any form is generally explicitly prohibited by school policies and regulations and the engagement of schools against aggression is often shown also by the implementation of specific prevention programs to reduce detrimental behaviors such as bullying, cyberbullying, exclusion and discrimination. According to the DSMM, social context factors do not act only on an interpersonal level, but also on an institutional and societal level (Valkenburg & Peter, 2013). It would have therefore been interesting to include school norms in this research, however the dataset from which we draw the data for our analyses did not include appropriate measures of this variable.

A further aspect that was not addressed in the present study is the descriptive norms of parents: because even adults may be involved in acts of cyber aggression (Barlett & Chamberlin, 2017), it would be interesting to explore whether their behavior – and not only that of peers – might contribute shaping their child's aggressive conduct in online settings.

Then, while early adolescence can be considered a period of important changes in media consumption, online behaviors and susceptibility to normative influences, it is important to mention that the focus on this particular age group might have limited the size of found effects. Indeed, cyber aggressive behaviors have been reported to increase throughout adolescent years (Barlett & Chamberlin, 2017), meaning that our study could have failed to capture the occurrence of more significant changes. We therefore recommend that future studies will explore the impact of media exposure and social norms on cyber aggression also in a sample of older adolescents.

Finally, in our study we did not explore the role of gender. Because a recent systematic review reported that exposure to media violence significantly increases the risk of perpetrating online forms of aggression especially in males (Camerini et al., 2020), it would have made sense to verify this effect also in our sample. However, in our exploratory analyses we found that gender did not have a significant impact on individual levels of cyber aggression. For the sake of simplicity, we therefore decided to exclude this variable.

6. Conclusion

The present study provides evidence regarding the contribution of both exposure to antisocial media content and different types of social norms in the development of cyber aggression. In line with previous research, our findings show that a more frequent exposure to antisocial media content is significantly associated with higher rates of individual cyber aggression. In addition, our study confirms that perpetration of cyber aggression is more frequently reported also by those early adolescents who perceive that their parents and their peers are more tolerant of this behavior. While previous research has already proven that during adolescence the engagement in online aggressive behaviors tends to increase, our analyses reveal that the injunctive norm of parents has a significant impact on the rate of change: when perceiving that their parents are more disapproving of aggression, children's increase in cyber aggression is less steep. This result suggests that interventions focusing on parental practices might be effective in slowing down the adoption of online aggression. In addition, our study explored the interaction of social norms with exposure to antisocial media content, showing a moderation effect of collective descriptive norms. This means that the behavior of peers can reinforce the impact of media exposure on cyber aggression. Differences in the effect of descriptive and injunctive

norms might be related to the characteristics of online environment, which allows to act anonymously and avoid social sanctions. We encourage future research that compares the impact of social norms in online and offline contexts.

Authors' contribution

AB conceived of the study, participated in its design and data collection, performed statistical analysis, and drafted the manuscript; PJS conceived of the study, participated in its design and statistical analysis, and helped to draft the manuscript. All authors read and approved the final manuscript.

Declaration of competing interest

None.

Appendix A

The measurement invariance of online aggression (the dependent variable) was tested in a structural equation modeling framework using confirmatory factor analysis. Because of the (non-surprising) non-normally distributed data of cyberbullying perpetration, we used the MLR estimator of Mplus (Version 7.4) instead of the Maximum-likelihood estimator. Widaman and Reise (1997) introduced four levels of measurement invariance, subsequently leading from weak to strong level of measurement invariance. Only in case of strong invariance is the claim justified that the cross-time measurement invariance indicates that "any differences are true differences in the constructs and are not due to changes in the measurement properties of the constructs." (Little, 2013, p. 167). First, we looked at the weakest form of measurement invariance, called configural invariance, or sometimes also "equal form" (Brown, 2006), meaning that the number of factors and pattern of indicator-factor loading is constant in all three waves. To allow for correlations between the measurement error variables that pertain to the same indicator across the three waves, we modeled indicator-specific effects (cf., Geiser, 2013) instead of autocorrelations between residual variables. Next, we checked the weak factorial invariance (also labeled "metric invariance", Brown, 2006), which requires that the factor loadings of the indicators be the same over time. At the next highest level we tested for strong factorial invariance, which is fulfilled when beside the factor loadings also the intercepts of the indicators are time-invariant. In a last step, we looked at the strict factorial variance which is satisfied when beside loadings and intercepts the residual variances of the indicators are also unchanged over time. As shown in Table A1, the overall fit statistics of each of the four levels of measurement invariance as indicated by RMSEA, CFit, SRMR, and TLI is consistent with a good model fit. The configural level of factorial invariance shows a good fit to the data ($p = 0.8794$) as do the weak factorial invariance model ($p = 0.8758$), the strong factorial invariance model ($p = 0.8575$) and the strict invariance model ($p = 0.2175$).

Table A1
Longitudinal Invariance of a Measurement Model of Cyber Aggression.

	χ^2	*df*	χ^2_{diff}	Δ*df*	RMSEA (90% CI)	CFit	SRMR	CFI	TLI
Configural factorial invariance	10.542	17			0.000 (0.000–0.013)	1.000	0.014	1.000	1.008
Weak factorial invariance	17.164	25	6.622	8	0.000 (0.000–0.011)	1.000	0.023	1.000	1.006
Strong factorial invariance	21.046	29	3.882	4	0.000 (0.000–0.012)	1.000	0.021	1.000	1.006
Strict factorial invariance	41.207**	35	20.161	6	0.012 (0.000–0.024)	1.000	0.042	0.996	0.996

Note. RMSEA, root mean square error of approximation; 90% CI, 90% confidence interval for RMSEA; CFit, test of close fit (probability RMSEA ≤.05); SRMR, standardized root mean square residual; CFI, comparative fit index; TLI, Tucker-Lewis Index. $^{**}p < 0.01$.

To test whether the higher level model of invariance fits the data significantly worse compared to its predecessor model, we conducted a chi-square difference test by hand. The results of these tests of the models, which are hierarchically nested, are reported in the column χ^2_{diff}. Not a single significant difference results from these tests of the first three models, meaning that the more restricted model (weak invariance to configural, and strong invariance to weak invariance) does not fit significantly worse than its predecessor model. Hence, the assumption of strong factorial invariance is not rejected for our data and the more parsimonious model can be used. Although the overall fit indices of the strict invariance model suggest a good fit of data, the chi-square difference test yields a significant difference ($p < 0.01$) between the strong and the strict model of invariance. Therefore, the model with less restrictions (equal loadings and intercepts, but unequal residual variances of the indicators) seems to be preferable. Also applying the Bayesian information criterion (BIC) as an additional criterion for model comparison, according to which smaller BIC values suggest better model fit, the strong invariance appears to be only slightly better (BIC = 11841.041) than the strict variance (BIC = 11869.446). To provide further evidence for the acceptability of the strong respectively the strict invariance model, we report more specific information about the models. For both models the indicators are significantly ($p < 0.001$) and in most of the cases strongly related to the construct of online aggression with a range of completely standardized factor loadings of 0.67–0.88 for the strong and 0.64 to 0.90 for the strict invariance model. Furthermore, the indicator-specific effects are minor, ranging from 0.164 to 0.333, meaning that at most 11% of the observed variability goes back to indicator-specific effects, which can be seen as unproblematic (Geiser, 2013). The test-retest covariance of the latent construct is statistically significant (model strong variance: $\varphi_{21} = 0.48$, $p < 0.001$, $\varphi_{32} = 0.53$, $p < 0.001$, $\varphi_{31} = 0.45$, $p < 0.001$; model strict variance: $\varphi_{21} = 0.48$, $p < 0.001$, $\varphi_{32} = 0.54$, $p < 0.001$, $\varphi_{31} = 0.45$, $p < 0.001$). In summary, the indicators of online aggression show high reliabilities and strong and strict factorial invariance can be assumed for the data.

Appendix B

Table B1
Correlations among cyber aggression, exposure to antisocial media violence and social norms.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. EAMC	1																			
2. EAMC	.455**	1																		
3. EAMC	.451**	.582**	1																	
4. EAMC	.438**	.568**	.649**	1																
5. Cyber aggression	.182**	.144**	.122**	.145**	1															
6. Cyber aggression	.207**	.297**	.227**	.234**	.376**	1														
7. Cyber aggression	.169**	.269**	.350**	.257**	.278**	.455**	1													
8. Cyber aggression	.170**	.206**	.263**	.308**	.364**	.416**	.495**	1												
9. D.norm	.049	.098**	.022	.087**	.291**	.123**	.012	.126**	1											
10. D. norm	.067*	.130**	.045	.111**	.119**	.300**	.109**	.169**	.409**	1										
11. D. norm	.042	.089**	.096**	.100**	.009	.124**	.263**	.146**	.020	.403**	1									
12. D. norm	.088**	.112**	.086**	.139**	.136**	.174**	.136**	.294**	.411**	.552**	.502**	1								
13. I. peer norm	.182**	.173**	.166**	.156**	.191**	.194**	.160**	.175**	.097**	.096**	.036	.076**	1							
14. I. peer norm	.173**	.220**	.213**	.204**	.187**	.258**	.214**	.221**	.070**	.159**	.096**	.129**	.446**	1						
15. I. peer norm	.193**	.247**	.326**	.244**	.185**	.260**	.292**	.230**	.051	.172**	.175**	.162**	.383**	.516**	1					
16. I. peer norm	.159**	.212**	.226**	.246**	.128**	.144**	.223**	.259**	.077**	.147**	.110**	.172**	.375**	.453**	.529**	1				
17. I. par. norm	.210**	.228**	.176**	.179**	.245**	.207**	.144**	.194**	.100**	.086**	.014	.079**	.422**	.252**	.194**	.190**	1			
18. I. par. norm	.140**	.203**	.174**	.140**	.150**	.287**	.198**	.191**	.081**	.150**	.080**	.123**	.248**	.394**	.251**	.225**	.376**	1		
19. I. par. norm	.200**	.282**	.333**	.244**	.142**	.267**	.333**	.292**	.031	.141**	.136**	.127**	.252**	.319**	.392**	.314**	.321**	.427**	1	
20. I. par. norm	.187**	.218**	.236**	.298**	.159**	.206**	.252**	.391**	.058*	.120**	.131**	.195**	.171**	.243**	.266**	.397**	.297**	.394**	.431**	1

Note. * Correlation is significant at the 0.05 level (2-tailed). ** Correlation is significant at the 0.01 level (2-tailed). EAMC = Exposure to Antisocial Media Content; D.norm = Descriptive norm; I.peer norm = Injunctive peer norm; I. par. norm = Injunctive parental norm.

Appendix C

To verify whether exposure to antisocial media content, cyber aggression and social norms are subject to significant changes over time, we used an ANOVA with repeated measures to compare mean values across waves. Because the assumption of sphericity was violated, a Greenhouse-Geisser correction was applied. Results are summarized in the following table.

Table C1
Changes in means across waves.

	t1 – t2	t2 – t3	t3 – t4	F
EAMC	↗*	↘*	↗*	F (2.930, 4105.351) = 308.789, p < 0.001
Cyber aggression	↗*	↘*	↗*	F (2.846, 3962.060) = 70.515, p < 0.001
Descriptive norm	↗*	↘*	↗*	F (2.946, 4295.183) = 931.251, p < 0.001
Injunctive peer norm	↗*	↗*	↗*	F (2.928, 4151.284) = 49.762, p < 0.001
Injunctive parental norm	↘*	↗*	↘*	F (2.923, 4189.150) = 51.407, p < 0.001

Note. * The mean difference is significant at the 0.05 level.

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