

DON'T PUSH MY BUTTONS!

EMOTIONS AND ONLINE BEHAVIOR IN ADOLESCENCE

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SUMMARY

Adolescents are avid users of digital technologies. A large body of research on adolescents' use of digital technologies has documented which devices adolescents use to go online, what adolescents do online, and which risks and opportunities they face in online communication. Further, several studies have uncovered factors related to adolescents' likelihood to be involved in online phenomena such as cyberbullying. However, far fewer studies have investigated *why* adolescents become involved in these phenomena. More research is needed to come to a full understanding of the personal and contextual processes underlying online behaviors, and the interaction between these processes. Furthermore, the large majority of research on adolescents' online behavior has focused on antisocial behavior. In contrast, online prosocial behavior has received much less attention, even though this type of behavior is also common among adolescents online and could be an effective counterweight against online negativity.

This doctoral dissertation aims to address these lacunae in the research on adolescents' online behavior. Firstly, it aims to explore both the *antisocial* and *prosocial* dimensions of adolescents' online behavior. Secondly, this dissertation turns attention to *emotional processes* as one of the factors influencing adolescents' online behavior. These research aims were addressed via a longitudinal survey study and a daily diary study.

This dissertation consists of seven chapters addressing these research aims. First, a methodological chapter describes the development and validation of a measurement instrument for online prosocial behavior. The second chapter examines adolescents' online prosocial and antisocial behavior and explores the longitudinal associations between these two behaviors. In Chapter 3, the mediating role of anger in the relation between adolescents' sleep quality and cyberbullying perpetration is examined. Chapter 4 explores the association of positive and negative emotions with online prosocial and antisocial behavior, taking into account adolescents' use of digital media. In Chapter 5 findings from the daily diary study on the association between happiness and online prosocial behavior in adolescents and their parents are presented. The sixth chapter discusses the moderating role of affective styles (i.e., habitual tendencies of emotion regulation) in the association

between experienced events, emotions, and cybervictimization. Finally, chapter 7 examines whether patterns of cybervictimization emerge in adolescents and adults, and links these patterns to emotion regulation strategies.

The findings from this dissertation suggest that adolescents' online behavior is more often prosocial than antisocial. Further, they show that emotional processes, linked with daily life functioning, appear to be one of the factors that contribute to adolescents' online prosocial and antisocial behavior. These findings contribute to the literature on adolescents' online behavior by shedding light on their prosocial online peer interactions and on the emotional processes guiding adolescents' online behavior. The dissertation concludes with a reflection on the implications of these findings for theory and practice.

SAMENVATTING

Adolescenten maken fervent gebruik van digitale technologieën. Een groot aantal wetenschappelijke studies documenteert welke apparaten adolescenten gebruiken om online te gaan, wat adolescenten online doen en welke risico's en kansen online communicatie hun bieden. Verder hebben verscheidene studies aangetoond welke factoren gerelateerd zijn aan het risico om betrokken te zijn in online gedragsfenomenen zoals cyberpesten. Veel minder studies hebben onderzocht *waarom* adolescenten betrokken geraken in dit soort gedrag. Er is meer onderzoek nodig om de achterliggende persoonlijke en contextuele processen en de interactie tussen deze processen ten volle te begrijpen. Bovendien is onderzoek grotendeels gericht op online antisociaal gedrag en heeft online pro sociaal gedrag tot nog toe weinig aandacht gekregen. Nochtans lijken adolescenten online ook veel pro sociaal gedrag te stellen en zou dit gedrag een goed tegengewicht kunnen bieden tegen online wangedrag.

Deze doctoraatsthesis poogt een antwoord te bieden op die lacunes in het onderzoek over het online gedrag van adolescenten. Ten eerste worden in deze thesis beide dimensies van online gedrag, zowel de *antisociale* als de *prosociale* dimensie, onderzocht. Ten tweede gaan we dieper in op de rol van persoonlijke processen in het online gedrag van adolescenten, meer bepaald door te onderzoeken welke rol *emotionele processen* hierin spelen. Deze thema's werden onderzocht door middel van een longitudinaal vragenlijstonderzoek en een dagboekstudie.

In de zeven hoofdstukken van deze doctoraatsthesis proberen we meer licht te werpen op deze thema's. In het eerste hoofdstuk beschrijven we de ontwikkeling en validering van een meetinstrument om online pro sociaal gedrag te bevragen. In het tweede hoofdstuk wordt het antisociaal en pro sociaal online gedrag van adolescenten gelijktijdig onderzocht en exploreren we de longitudinale verbanden tussen beide gedragingen. In het derde hoofdstuk wordt onderzocht of er een verband is tussen slaapkwaliteit en cyberpesten en of kwaadheid dit verband verklaart. In het vierde hoofdstuk onderzoeken we het verband tussen positieve en negatieve emoties enerzijds en pro sociaal en antisociaal online gedrag anderzijds, rekening houdend met het digitalemediagebruik van adolescenten. Hoofdstuk

vijf presenteert de resultaten van het dagboekonderzoek over het verband tussen blijheid en pro sociaal online gedrag bij adolescenten en hun ouders. In hoofdstuk zes wordt de modererende rol van affectieve stijlen (habituele emotieregulatie) geanalyseerd in het verband tussen meegemaakte gebeurtenissen, emoties en cyberpeestslachtofferschap. In het zevende hoofdstuk, ten slotte, wordt bij adolescenten en volwassenen onderzocht of cyberpeestslachtoffers in groepen in te delen zijn op basis van op welke manier ze gepest worden en wordt onderzocht of dit verband houdt met emotieregulatiestrategieën.

De resultaten van deze doctoraatsthesis suggereren dat het online gedrag van adolescenten vaker pro sociaal dan antisociaal is. Daarnaast blijkt uit de resultaten dat emotionele processen, gelinkt aan dagelijks functioneren, een invloed hebben op het online gedrag van adolescenten. De bevindingen over het pro sociaal online gedrag van adolescenten en de emotionele dynamieken die online gedrag beïnvloeden, dragen bij aan de wetenschappelijke literatuur over online gedrag. Deze doctoraatsthesis eindigt met een kritische reflectie over de theoretische en praktische implicaties van dit onderzoek.

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No duty is more urgent than that of returning thanks. - James Allen

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INTRODUCTION TO THE DISSERTATION

In the past decades, our social lives have changed dramatically. Whereas not so long ago interactions predominantly took place when people physically met, such as at school, work or home, nowadays we can (theoretically) interact with each other any place and time, thanks to the availability of all sorts of information and communication technologies (ICT). ICT create opportunities to be connected 24/7 and this has had a profound impact on the way we interact with each other, the frequency and speed of our interactions, and the nature of our interactions (Walther, 1996). The ability to communicate via digital devices has also enabled the emergence of new phenomena. On the one hand, novel forms of antisocial behavior have come to exist, such as cyberbullying (Kowalski, Giumetti, Schroeder, & Lattanner, 2014), cybercrime (Martin & Rice, 2011), and online trolling (Buckels, Trapnell, & Paulhus, 2014); on the other hand, ICT have also created new opportunities for positive interactions, such as online dating (Whitty & Carr, 2006), online support groups (Barak, Boniel-Nissim, & Suler, 2008), and e-therapy (Castelnuovo, Gaggioli, Mantovani, & Riva, 2003).

Whereas older adults have experienced the rising popularity of ICT and have had to acquaint themselves with these technologies after childhood, children in this day and age grow up with ICT and have not known life without it. The nature of their peer interactions is therefore different from that of their parents when they grew up (Tapscott, 1998). Many contemporary adolescent interactions take place via digital technologies and this influences their relational and personal functioning (Subrahmanyam & Greenfeld, 2008). As one of the most important tasks in adolescence is developing autonomy and taking responsibility for own actions (Russell & Bakken, 2002), it is important that adolescents learn to use digital technologies in adaptive ways that help them become responsible, autonomous, well-functioning adults (J. D. Brown & Bobkowski, 2011).

Thanks to the considerable amount of existing research on adolescents' use of ICT, we now have extensive knowledge on which devices adolescents use to go online, what they do online, and which risks and opportunities they face in online communication (e.g., EU Kids Online, 2014). Further, several studies have uncovered factors related to adolescents' likelihood to be involved in online phenomena such as cyberbullying (Chen, Ho, & Lwin, 2017; Guo, 2016; Kowalski et al., 2014). However, far fewer studies have investigated *why*

adolescents become involved in these behaviors. Although several existing theoretical models have been applied to cyberbullying (e.g., Doane, Boothe, Pearson, & Kelley, 2016; Hay, Meldrum, & Mann, 2010; Heirman & Walrave, 2012; Kowalski et al., 2014), more research is needed to come to a full understanding of the personal and contextual processes underlying this behavior, and the interaction between these processes (e.g., why does this adolescent start cyberbullying in this particular situation, but another would not?). Furthermore, the large majority of research on adolescents' online behavior has focused on antisocial behavior. In contrast, online *prosocial* behavior has received much less attention, even though this type of behavior is also common among adolescents online and could be an effective counterweight against online negativity.

This doctoral dissertation aims to address these lacunae in the research on adolescents' online behavior. Firstly, it aims to explore both the antisocial and prosocial dimensions of adolescents' online behavior. Secondly, this dissertation turns attention to the emotional processes behind adolescents' online behavior: are emotions one of the factors fueling adolescents' online social behavior? These research aims will be addressed via a longitudinal study and a daily diary study.

This dissertation was part of a larger project combining research lines of communication studies (cyberbullying among adolescents) and work and organizational psychology (workplace bullying). My research partner in this project was Ivana Vranjes, who simultaneously worked on a dissertation about adult cyberbullying in the workplace. The literature on workplace bullying has inspired parts of this dissertation, and the cross-fertilization of our research domains has resulted in the diary study that we conducted together.

The first part of this dissertation provides a detailed discussion of the core concepts and theories of the present research. After a review of the state of the art of the research on adolescents' online behavior, the daily life experiences and emotions that may contribute to this behavior are discussed, highlighting the lacunae in the current research. This is followed by seven empirical chapters, each covering a separate aspect of the central research questions or providing methodological support for the studies. The dissertation

concludes with an overall discussion of the findings and implications of the results for practice and future research.

ONLINE BEHAVIOR IN ADOLESCENCE

Adolescents (youth between 11 and 18 years old; Berk, 2014) are avid users of digital technologies. Nine out of every ten 16- to 19-year-olds in Europe make daily use of the internet, the highest proportion out of all age groups (Eurostat, 2015). In Flanders, more than 94.3% of the teenagers (aged 15-19) have their own smartphone, which they consider their most important digital device (Vanhaeleweyn & Marez, 2017).

Perhaps even more important than knowing how often adolescents use ICT, is knowing what adolescents actually *do* when they go online. In that regard, participating on social network sites seems especially popular amongst young people as compared to the whole population (Eurostat, 2015). Social media are also intensively used by Flemish adolescents, with Facebook, Snapchat, and Instagram being the most popular social network platforms (Mediaraven and LINC, 2016). It thus appears that social activities are an important part of adolescents' digital life.

Adolescence marks an important time period in the development of social behavior, as in this life phase an important change happens in the context in which social behavior mostly occurs. Throughout the course of adolescence, the time children spend with their parents decreases, whereas the time spent with peers increases (R. Larson & Richards, 1991). Consequently, social interactions between peers become increasingly important in adolescence (Van Rijsewijk, Dijkstra, Pattiselanno, Steglich, & Veenstra, 2016). Similarly, throughout adolescence the influence of peers on teenagers' behavior magnifies (B. B. Brown, 2004; Gardner & Steinberg, 2005), with peers influencing each other's risk-taking or antisocial behavior as well as each other's prosocial behavior (Allen & Antonishak, 2008; B. B. Brown, Bakken, Ameringer, & Mahon, 2008; van Hoorn, van Dijk, Meuwese, Rieffe, & Crone, 2016).

Social behavior can take on many forms and can be categorized into two dimensions: prosocial and antisocial behavior. These dimensions are also relevant in the online context, as will be discussed in the following sections.

ONLINE ANTISOCIAL BEHAVIOR

Antisocial behavior refers to behavior that violates social norms and is harmful to others or lacks consideration for others' well-being, such as lying, stealing, and bullying. In the last decades, the development of digital technologies has resulted in new, online forms of antisocial behavior. Examples of online antisocial behavior include hacking, spamming, cyberstalking, trolling, and flaming. Probably the most researched form of online antisocial behavior is cyberbullying, which is defined as "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" (Smith et al., 2008, p. 376).

PREVALENCE

International studies on cyberbullying have suggested that cyberbullying is most prevalent during middle school age, also known as early adolescence, and that the prevalence declines afterwards (Kowalski et al., 2014; Tokunaga, 2010). Cyberbullying prevalence estimates vary considerable between studies, depending on the definition used, respondents' age, the study's country of origin, and the reporting time frame (Kowalski et al., 2014). On average, between one to four out of every ten young people report having been a cyberbullying victim (Kowalski et al., 2014). Overall, prevalence rates for cyberperpetration are quite similar to those of cybervictimization (Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014). In Flanders, cyberbullying victimization rates among adolescents range from 7 to 16% in a six-month time frame, to 34% for lifetime cyberbullying victimization prevalence; whereas cyberbullying perpetration rates range from 6 to 11% in a six-month time frame, to 21% lifetime prevalence (Heirman et al., 2016).

The peak in (offline and online) antisocial behavior in early adolescence may have several explanations. First, the dual systems perspective (Casey, Getz, & Galvan, 2008; Shulman et al., 2016) proposes that a developmental imbalance in two neurobiological systems influences behavior in adolescence. The subcortical socio-emotional incentive-processing

system, which stimulates adolescents to engage in novel, pleasurable, and exciting activities, matures in early adolescence. The prefrontal cognitive control system, which is responsible for emotion regulation, impulse control, and conscious decision making, matures much more gradually up until adulthood (Casey et al., 2008; Shulman et al., 2016). This imbalance makes adolescents more sensitive to rewards and potentially hazardous but exciting activities, at a time when their impulse control and inhibition abilities are not fully developed yet (Harden & Tucker-Drob, 2011). Consequently, adolescents' online antisocial behavior may often be done 'on impulse', such as in reaction to a provocation or because bullies think it would be funny, without considering the effects of their behavior on their victims. Second, Moffitt (1993) has proposed that the rise of antisocial behavior in adolescence is due to the incongruence between adolescents' biological maturation and their status in modern society. Adolescents' bodies mature while their rights and privileges are restricted until they are considered adults. In response, adolescents' antisocial behaviors are often attempts to free themselves from parental control and to mimic having adult privileges. Additionally, an important risk factor for this behavior is the deviant behavior of their peers, as the influence of peers increases during adolescence. When they reach adulthood and obtain adult privileges, the peak in antisocial behavior declines rapidly (Moffitt, 1993). Consequently, adolescents' online antisocial behavior may also be done more purposively, to obtain status among peers and as an act of resistance against adult rules and expectations.

CONSEQUENCES

Involvement in cyberbullying as a victim or a perpetrator has significant implications for adolescents' well-being (Bottino, Bottino, Regina, Correia, & Ribeiro, 2015; Gunther, DeSmet, Jacobs, & De Bourdeaudhuij, 2016). Cyberbullying victimization has been associated with several negative consequences, such as feelings of anxiety (M. Campbell, Spears, Slee, Butler, & Kift, 2012), lower self-esteem (Patchin & Hinduja, 2010), depressive symptoms (Reed, Cooper, Nugent, & Russell, 2015), psychosomatic symptoms (Sourander et al., 2010), and self-harm and suicidal ideation (Hay & Meldrum, 2010). Cyberbullying perpetration has been associated with sequelae such as depression (J. Wang, Nansel, & Iannotti, 2011), substance use (Ybarra & Mitchell, 2004a), poor emotional bonds with

parents (Ybarra & Mitchell, 2004b), social difficulties and stress (M. A. Campbell, Slee, Spears, Butler, & Kift, 2013), and lower academic achievement and school attendance (Kowalski & Limber, 2013).

PREDICTORS

Research has identified several contextual and individual factors predicting involvement in cyberbullying.

Contextual Factors: Home, School, and Peers. Three domains play an important role in the social context of adolescents' daily lives: home/family, school, and peers (Perry, Kelder, & Komro, 1993; Phelan, Davidson, & Yu, 1998). Experiences in each of these domains have been shown to be associated with cyberbullying. For instance, in the family domain, lack of family support (Martins, Simão, Freire, Caetano, & Matos, 2016), poor adolescent-parent communication (Buelga, Martínez-Ferrer, & Cava, 2017), and low family self-concept, low family cohesion, and family conflict (Ortega-Barón, Buelga, & Cava, 2016) have been linked with victimization, whereas lack of family rules (Martins et al., 2016), family conflict (Buelga et al., 2017), and poor family management (Hemphill & Heerde, 2014) have been associated with perpetration. School variables that have been associated with cyberbullying victimization include low academic self-concept, low teacher support, feeling of affiliation to the school (Ortega-Barón et al., 2016), and negative school climate (Davis & Koepke, 2016). Low teacher bonding (Pabian & Vandebosch, 2015), low school commitment (Ybarra & Mitchell, 2004a), and negative school climate (Hinduja & Patchin, 2012; Williams & Guerra, 2007) have been associated with perpetration. Peer-domain correlates of cyberbullying include low peer popularity (Katzner, Fetchenhauer, & Belschak, 2009) and low perceived peer support in school (Hong et al., 2016) for victimization, and need for popularity (Vanden Abeele, Van Cleemput, & Vandebosch, 2017), perceived peer pressure (Shim & Shin, 2016; Vanden Abeele et al., 2017), and pro-cyberbullying class norms (Festl, Scharkow, & Quandt, 2015) for perpetration. Altogether, the research shows that negative experiences in adolescents' family, school, and peer context are associated with and predict cyberbullying involvement.

Individual Factors: Emotions. Next to the research on contextual risk factors for cyberbullying exists a large body of literature on individual characteristics associated with cyberbullying involvement. Among these, studies have shown associations of cyberbullying with affective or emotional factors such as emotion regulation deficits, lack of empathy, depression, and emotional intelligence (Baroncelli & Ciucci, 2014; Cappadocia, Craig, & Pepler, 2013; Gámez-Guadix, Orue, Smith, & Calvete, 2013; Hemphill & Heerde, 2014; Topcu & Erdur-Baker, 2012; Steffgen, Pfetsch, König, & Melzer, 2010). These associations of affective factors with cyberbullying involvement have mostly been examined in cross-sectional studies (all variables measured at the same time point), which means that it is not possible to be sure about the direction of the association, implicating that it might as well be that involvement in cyberbullying actually brings about affective consequences rather than the other way around (cf., studies on the emotional impact of cyberbullying: Giménez Gualdo, Hunter, Durkin, Arnaiz, & Maquilón, 2015; Ortega et al., 2012; Ortega, Elipe, Mora-Merchán, Calmaestra, & Vega, 2009). Nevertheless, there is tentative evidence that emotions are not only caused by cyberbullying, but are also factors that predict cyberbullying involvement. For example, anger has been shown to mediate the relationship between victimization and cyberperpetration (Ak, Özdemir, & Kuzucu, 2015; den Hamer, Konijn, & Keijer, 2014), and to be an important motive to cyberbully others (Compton, Campbell, & Mergler, 2014; Gradinger, Strohmeier, & Spiel, 2012; Runions, 2013). The association of emotions with online antisocial behavior will later be discussed in more detail.

The Interplay of Contextual and Individual Factors. The existing cyberbullying research has provided significant contributions in identifying the individual and contextual risk factors predicting cyberbullying involvement. Consequently, cyberbullying can be understood from the framework of the socio-ecological model (Bronfenbrenner, 1979), in which social phenomena are explained as an interaction of social, physical, institutional, cultural, and community contexts as well as individual characteristics. Most studies have examined individual and contextual factors in isolation, without considering possible mutual influences between them. However, behavior is always embedded in a context (Dodge, 2011), and studying individual and contextual or social factors in isolation may overlook

important moderating (i.e., interaction) processes implicated in this behavior. In particular, it could be that a contextual factor buffers or exacerbates the influence of an individual factor on cyberbullying involvement, or vice versa. For instance, feelings of anger may be especially likely to lead to cyberbullying perpetration in the presence of strong pro-cyberbullying class norms. Therefore, preferably individual and contextual factors are studied simultaneously to shed light on the interactions between the factors.

ONLINE PROSOCIAL BEHAVIOR

Prosocial behavior is voluntary behavior carried out with the intention of benefitting particular others or promoting harmonious relationships with others (Dovidio, Piliavin, Schroeder, & Penner, 2006; Eisenberg, Fabes, & Spinrad, 2006; Van Rijsewijk et al., 2016). Examples of prosocial behavior include comforting, helping, and sharing with others (Veenstra, 2006). There is a considerable amount of literature on offline prosocial behavior, but so far adolescents' *online* prosocial behavior has not received much research attention. Analogous to the definition of offline prosocial behavior, I propose to define online prosocial behavior as voluntary behavior carried out in an electronic context with the intention of benefitting particular others or promoting harmonious relations with others. Examples of online prosocial behavior include comforting a friend via digital technologies, online sharing of resources and information with a classmate, and helping peers out on social network sites. Also smaller acts such as liking a peer's post or posting a friendly comment to a friend's message can be considered online prosocial behavior, as these behaviors help maintaining good relationships with others (Reich, Subrahmanyam, & Espinoza, 2012). Prosocial behavior between adolescents most often takes place within relations, being directed towards particular others (Van Rijsewijk et al., 2016); therefore online actions that serve the general welfare are rather considered as forms of online civic engagement than as online prosocial behavior.

Despite the lack of scholarly attention, online prosocial behavior is important for several reasons. The first reason is that when people observe others behaving prosocially online, social norms promoting positive online interactions may strengthen, which could be important to counterbalance antisocial online behavior (Jang, Kim, & Jung, 2016). Secondly, positive online interactions may support social connectedness and improve relationship

quality, which can boost people's well-being and self-esteem (Valkenburg & Peter, 2009, 2011). As such, online prosocial behavior may engender positive outcomes at the individual, relational, and societal level.

PREVALENCE

A few previous studies have examined online prosocial behavior (Bosancianu, Powell, & Bratović, 2013; Lapidot-Lefler & Barak, 2015; C.-C. Wang & Wang, 2008; Wright, 2014; Wright & Li, 2011); however, most of these involved adult samples and none relied on tested and validated instruments to measure online prosocial behavior. Consequently, little is known about how often this behavior occurs and how it is related to online antisocial behavior. Therefore, this dissertation will attempt to shed light on adolescents' prosocial behavior online by examining the prevalence and comparing it with online antisocial behavior.

PREDICTORS AND CONSEQUENCES

The processes underlying online prosocial behavior have not received much research attention up to now. From the literature on adolescents' *offline* prosocial behavior, evidence indicates that prosocial behavior, similar to antisocial behavior, is also associated with contextual and personal factors. For instance, much research has shown that helping decreases as the number of bystanders increases, the so-called *bystander effect* (Darley & Latané, 1968; Fischer et al., 2011). Prosocial behavior also seems to decline when individuals are socially excluded (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). As for personal factors, it appears that one of the factors predicting and resulting from prosocial behavior is positive affect (Aknin, Hamlin, & Dunn, 2012; Dunn, Aknin, & Norton, 2008; George, 1991; George & Brief, 1992; Snippe et al., 2018). In other words, there seems to be a bidirectional link between feeling good and doing good. Whether online prosocial behavior is also associated with positive emotions, has not been examined up to now. Therefore, this dissertation will attempt to explore the role of affective processes (specific emotions and emotion regulation processes) in adolescents' online prosocial behavior.

CONCLUSION

Taken together, the rapidly growing body of literature on adolescents' online antisocial behavior has uncovered many contextual and individual factors associated with this behavior. Much less research has been devoted to adolescents' online prosocial behavior, with many questions remaining about the prevalence, antecedents, and consequences of this behavior. Furthermore, only a few studies have examined the emotional factors underlying adolescents' online social behavior, and the interplay of these factors with aspects of adolescents' daily life functioning. Therefore, this dissertation attempts to further disentangle the association between adolescents' daily life, their emotions, and their online antisocial and prosocial behavior. The following section discusses the literature on adolescents' daily experiences, their emotions, and their online social behavior, and the associations between them, highlighting the aspects and processes that need further clarification and will be addressed in this dissertation.

DAILY LIFE EXPERIENCES, EMOTIONS, AND ONLINE SOCIAL BEHAVIOR

A pivotal concept in this dissertation is *emotion*. An emotion is an internal reaction to a stimulus that is perceived as relevant for a person's goals, which elicits a response tendency (Frijda, 1988; Gross & Thompson, 2007). Emotions consist of five components: cognitive appraisal (evaluation of a situation), physiological arousal, a subjective feeling, a motivational component (including action readiness tendencies or behavior intentions), and motor expression (Scherer, 1984). The following subsections discuss the experiences eliciting adolescents' emotions, adolescents' emotional life, and their online emotion-related social behavior.

EXPERIENCES GENERATING EMOTIONS

Per definition an emotion is a reaction to a stimulus, but which stimuli elicit adolescents' emotions? A substantial body of literature has considered the influence of negative experiences or stressors on adolescents' psychological and emotional well-being (for reviews, see Grant et al., 2003, 2006; Grant, Compas, Thurm, McMahon, & Gipson, 2004). Potential stressful life experiences for adolescents include acute traumatic events, e.g., witnessing the death of a relative, chronic adversity, e.g., living in poverty, and the

aggregation of daily hassles and stressful life events that may or may not be part of normal development (Grant et al., 2003).

As already touched upon, three important domains of adolescents' daily social lives are the home/family, school, and peer domain, as these domains undergo significant changes during adolescence (Perry et al., 1993; Phelan et al., 1998). Although time spent with parents decreases during adolescence (R. Larson & Richards, 1991), many of adolescents' interpersonal interactions still take place within the family (Laursen & Collins, 2009). Hence, family conflict can be a significant source of stress in adolescence (Chung, Flook, & Fuligni, 2011). Another source of adolescent stress are school experiences. Adolescents' academic behaviors are gradually less monitored by their parents during secondary school, and adolescents themselves become increasingly responsible for their school work and academic achievements (Spera, 2005). Thirdly, peer experiences are another important stress domain in adolescence. Adolescents transfer from primary school to secondary school and may have to navigate new peer groups as a consequence of the transition. Also, adolescents develop more intimate peer relations and become more autonomous, while trying to maintain positive relations with their family members (Eccles et al., 1993). Previous daily diary studies have shown that daily negative and positive experiences in each of these domains contribute to adolescents' emotional states: Family, peer, and school stressors are associated with increased negative and decreased positive emotions (Chung et al., 2011; Flook, 2011; Kiang & Buchanan, 2014; Morrow, Hubbard, Barhight, & Thomson, 2014; Verma, Sharma, & Larson, 2002), whereas adolescents' daily positive interpersonal experiences are linked with increased positive and decreased negative emotions (Flook, 2011).

EMOTIONS IN ADOLESCENCE

The challenges across multiple life domains that individuals face in adolescence, expose them to stressors and evoke multiple emotions (Rosenblum & Lewis, 2003). Adolescents not only experience more intense emotions than adults, they also experience negative emotions more frequently than younger and older age groups (R. Larson, Csikszentmihalyi, & Graef, 1980; Rosenblum & Lewis, 2003). The increase in negative emotions is the largest in early adolescence, and levels off in late adolescence (R. W. Larson, Moneta, Richards, &

Wilson, 2002). The most important factor related to the increased negative mood in early adolescence appears to be stressful life events (Brooks-Gunn & Warren, 1989; R. Larson & Ham, 1993). The number of experienced stressful life events has been shown to stabilize or even decrease as adolescents grow older (Compas, Davis, & Forsythe, 1985; Ge, Lorenz, Conger, Elder, & Simons, 1994), which might explain the concurrent stabilization of negative affect.

Another possible explanation for the stabilizing or diminishing trend of negative affect with age is the development of more adaptive emotion regulation skills and increased motivation for emotion regulation (Carstensen, Isaacowitz, & Charles, 1999). Emotion regulation, or how people cope with their emotions, is an important predictor and indication of adolescents' psychosocial functioning (Zeman, Cassano, Perry-Parrish, & Stegall, 2006). Emotion regulation has been defined as "the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially their intensive and temporal features, to accomplish one's goals" (Thompson, 1994, pp. 2–3). The use of emotion regulation strategies develops across the lifespan, with the smallest repertoire of adaptive emotion regulation strategies in middle adolescence (Zimmermann & Iwanski, 2014). Having a limited range of emotion regulation strategies seems to be associated with internalizing problems in adolescence (Lougheed & Hollenstein, 2012). Additionally, not only the range of strategies seems to matter, but also which strategies a person uses. Which emotion regulation strategy is effective, is supposed to be contingent on the specific situation or emotional cue (Haines et al., 2016; Larsen & Prizmic, 2004). For instance, verbal expression might be an adaptive strategy to cope with sadness, but it is less effective to regulate anger (Rivers, Brackett, Katulak, & Salovey, 2007).

Research consistently indicates that children who fail to adaptively regulate their emotions show increased rates of ostracism, peer rejection, and victimization, but also of aggression, bullying, and antisocial behavior (Eisenberg et al., 1995; Pope & Bierman, 1999; Schwartz & Proctor, 2000; Shields & Cicchetti, 2001). Emotion regulation also appears to be associated with prosocial behavior. For instance, high-prosocial children score higher on teacher-rated measures of emotion regulation (Greener, 1998). Most research in the prosocial domain has examined how emotion regulation moderates the association of other emotion-related

variables (e.g., empathy) with prosocial behavior (e.g., Lockwood, Seara-Cardoso, & Viding, 2014). In that regard, Eisenberg and Fabes (1992) have proposed that a combination of individuals' emotional arousability (including reactivity and intensity) and emotion regulation skills influences prosocial behavior. In particular, when an individual perceives that someone is distressed, he or she will become emotionally aroused, but the person's emotion regulation capacities will influence whether he or she will either focus on relieving his or her own distress or help the other (Eisenberg & Fabes, 1992). Furthermore, the degree of emotion regulation (optimal, over- or underregulation) when a person is emotionally aroused is also proposed to influence the tendency towards behaving prosocially or not (Eisenberg & Fabes, 1992). In the case of optimal emotion regulation, individuals are able to regulate their arousal in such way that they do not become too aroused themselves by witnessing someone else's distress, and consequently don't become too self-focused, increasing their likelihood to behave prosocially. In contrast, overregulation stimulates proactive withdrawal, decreasing the likelihood of prosocial behavior; whereas underregulation fuels aggression, increasing the likelihood of antisocial rather than prosocial behavior (Eisenberg & Fabes, 1992).

ONLINE SOCIAL BEHAVIOR

Regardless of age or life phase, abundant research has shown that people say and do things online that they would not do offline (Joinson, 1998; Lowry, Zhang, Wang, & Siponen, 2016; Postmes, Spears, Sakhel, & de Groot, 2001; Schouten, Valkenburg, & Peter, 2007). The phenomenon that individuals behave less restrained online than offline has been described as the "online disinhibition effect" (Suler, 2004). Many online behaviors, antisocial as well as prosocial, may be attributed to the online disinhibition effect (Hirsh, Galinsky, & Zhong, 2011; Lapidot-Lefler & Barak, 2012, 2015). It seems that the psychological restraints that would normally withhold people from expressing or acting on emotions or drives, are often lowered in online interactions (Lapidot-Lefler & Barak, 2012).

Several features of digital technologies may contribute to disinhibited antisocial and prosocial behavior online (Heirman et al., 2015; Suler, 2004). One of these is that online communication is often text-based, and text-based communication is characterized by a lack of non-verbal cues: When communicating by text online, we can neither observe the

non-verbal language of our respondent, nor can the respondent see our own non-verbal language. This amplifies the disinhibition effect because online we worry less about our own or the other's non-verbal messages (Suler, 2004). Another contributing factor is the anonymity that digital technologies can allow: We can hide our identities online, which may reduce our sense of accountability for our actions and can allow to escape from supervision and the threat of negative sanctions. Also, digital technologies are available 24/7, which allows for 24/7 communication. Offline, we need to wait for face-to-face contact to be able to express ourselves to someone, but this is not necessary online, where communication and social behavior is possible any place and any time.

THE ROLE OF DAILY EXPERIENCES AND EMOTIONS IN ONLINE BEHAVIOR

ASSOCIATIONS BETWEEN EXPERIENCES, EMOTIONS, AND BEHAVIOR

How exactly are experiences, emotions, and behavior linked to each other? Theories from several research traditions have proposed that emotions mediate the association between daily experiences and (offline, negative) behavior. For instance, in the General Aggression Model (GAM; Anderson & Bushman, 2002), frequently used to explain human aggression, one of the pathways through which a specific event can give rise to an aggressive reaction is an affective pathway. This affective pathway entails increased feelings of anger, hostility, and general negative affect in response to an incident, combined with personal and contextual factors. This pathway, together with an arousal and cognitive pathway, contributes to an internal state that influences the likelihood of aggression (Gilbert, Daffern, & Anderson, 2017).

Another theory assigning a mediating role to emotions is the Affective Events Theory (AET; Weiss & Cropanzano, 1996), a theory which was developed by work and organizational psychologists to explain how events at work influence employees' work behaviors and attitudes. The AET suggests that workers' affect-based work behaviors (such as organizational citizenship behavior) and work attitudes are driven by their emotional reactions to work events. This theory has been applied to explain negative behaviors at work, such as workplace bullying (e.g., Glasø, Vie, Holmdal, & Einarsen, 2011). Relatedly, the Stressor-Emotion-Control/Support-Model (Spector & Fox, 2005) was also developed to

explain the associations between work-related events, negative emotions, and behavior. This model proposes that work-related stressors elicit negative emotions, which in turn predict work-related behavior and well-being, a process that is moderated by perceived control and support. The underlying framework of the latter two theories is the stressor-strain model, which posits that exposure to stressful work conditions induces psychological, physical, and behavioral strain (e.g., Fox, Spector, & Miles, 2001). The relationship between stressors and strains is proposed to be mediated by affect (or emotions), as emotions are the immediate reactions to stressors and motivate psychological (attitudinal), physical, and behavioral changes (Fox et al., 2001; Weiss & Cropanzano, 1996). In line with these theories, this dissertation will examine the mediating role of emotions in the association between experiences and online social behavior.

Besides the mediation by emotions, research has shown that the association between experiences and behavior is mediated and moderated by emotion regulation. For instance, in a longitudinal study among adolescents, Flouri and Mavroveli (2013) found that cognitive reappraisal was a protective factor that moderated (but did not mediate) the effect of increased life stress on worsening of problem behavior. Findings from another longitudinal study indicated that emotion dysregulation (i.e., difficulty or inability in coping with experience or processing emotions) mediated the association of both peer victimization and stressful life events with subsequent adolescent aggressive behavior (Herts, McLaughlin, & Hatzenbuehler, 2012). Thus, in this dissertation the role of emotion regulation in online social behavior will also be taken into account.

EMOTIONS AND ONLINE SOCIAL BEHAVIOR

Research on the emotional dynamics of online behavior has explored two aspects of adolescents' affect: how emotional experiences are related to online behavior on the one hand, and how emotion regulation links to online behavior on the other hand.

Emotional Experience and Online Social Behavior. Many studies have examined the association between emotional experience and online social behavior. These studies have indicated that emotions can be antecedents as well as consequences of online behavior. Regarding emotions as antecedents of online behavior, research on the role of anger in

cyberbullying has shown that anger mediates the relationship between victimization and cyberperpetration cross-sectionally (Ak et al., 2015; den Hamer et al., 2014). Other quantitative and qualitative studies examining the motives for cyberbullying have reported that anger, revenge, and jealousy are common motives to cyberbully others (Compton et al., 2014; Gradinger et al., 2012; Kellerman, Margolin, Borofsky, Baucom, & Iturralde, 2013; König, Gollwitzer, & Steffgen, 2010). Moreover, findings from a qualitative interview study among high school students indicated that internal motivations, i.e., motivations associated with the perpetrator's emotional state, such as wanting to take revenge or to make oneself feel better, were reported more frequently as motivations for cyberbullying than external motivations, i.e., factors specific to the situation or target (Varjas, Talley, Meyers, Parris, & Cutts, 2010). These findings suggest that emotions, in particular outward-focused emotions such as anger, jealousy, and revenge, can be triggering factors for individuals to cyberbully others, regardless of whether the target was involved in eliciting the emotion in the first place. For instance, an adolescent who is angry because he was ridiculed by a popular classmate in school, may, after coming home from school, log onto Facebook and post nasty comments on another peer's wall as a way to alleviate his anger. In other words, the online context may facilitate displaced aggression, i.e., anger-fueled aggression against an innocent person who was not responsible for the anger (Marcus-Newhall, Pedersen, Carlson, & Miller, 2000; Wright & Li, 2012). Taken together, it seems that adolescents' online antisocial behavior can be a sort of emotion regulation strategy, namely a way through which adolescents can alleviate their negative emotions by acting them out on someone else online.

Whether emotions are also a predictive factor for cybervictimization is less clear, because most studies on the association between emotions and cybervictimization have focused on emotional outcomes rather than antecedents. In that regard, findings from cross-sectional studies have indicated that cybervictimization is associated with depressive and anxious feelings (M. Campbell et al., 2012; Machmutow, Perren, Sticca, & Alsaker, 2012; Na, Dancy, & Park, 2015; Sjørø, Fandrem, & Roland, 2014). One study reported bidirectional associations between depressive feelings and cybervictimization, indicating that depressive symptoms can also precede later victimization (Gámez-Guadix et al., 2013). It has been

suggested that the experience of negative avoidance-related emotions, such as fear and sadness, may predict victimization (Vranjes, Baillien, Vandebosch, Erreygers, & De Witte, 2017). Fear and sadness stimulate withdrawal and submissive reactions, and signal lack of power (Lazarus, 1991; Tiedens, 2001). Consequently, people who are angry may direct their anger against those individuals who do not seem to be able to defend themselves, which might make sad and fearful individuals “easy targets” for victimization, especially online where people experience less psychological restraints (Vranjes et al., 2017).

As for emotions as antecedents of online prosocial behavior, so far there seems to be little research addressing this topic. However, the literature on offline prosocial behavior can shed some light on the possible emotional processes linked to prosocial behavior. Several studies have revealed the important role of positive emotions, such as gratitude, forgiveness and empathy, in the development of and engagement in prosocial behavior (Bartlett & DeSteno, 2006; Eisenberg, 2015; Karremans, 2005). Furthermore, evidence from studies with samples of all ages indicates that prosocial behavior and happiness are related (Aknin, Broesch, Hamlin, & Van de Vondervoort, 2015; Aknin, Hamlin, et al., 2012; Nelson, Layous, Cole, & Lyubomirsky, 2016; Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006). In fact, happiness and prosocial behavior seem to mutually reinforce each other: for instance, it has been shown that prosocial spending increases happiness, which in turn stimulates prosocial spending, forming a positive feedback loop (Aknin et al., 2013; Aknin, Dunn, & Norton, 2012). More generally, a positive feedback loop between positive emotions and positive behavioral experiences has been observed in many studies (e.g., Fredrickson & Joiner, 2002; Garland et al., 2010; Handley, Lassiter, Nickell, & Herchenroeder, 2004; Snippe et al., 2018). A possible explanation for this bidirectional link between positive affect and prosocial behavior is that prosocial behaviors can be used instrumentally to maintain an already existing positive feeling, referred to as the “feel-good, do-good” effect (Rosenhan, Salovey, & Hargis, 1981). Relatedly, Wegener and Petty (1994) have proposed this is a *mood maintenance* process by which people in a happy mood seek out positive experiences to maintain or elevate their mood. Further, according to the Broaden-and-Build Theory (Fredrickson & Joiner, 2002), experiencing positive emotions expands people’s mindset (“broaden”), which may stimulate people to think of others and

do good for them (“building” relationships and resources). Whether the association between positive emotions and *online* prosocial behavior also exists, has not been examined up to now (although the antecedents of posting of benevolent comments online have attracted some research attention, e.g., Lee, Kim, & Cho, 2014).

Emotion Regulation and Online Behavior. With regards to the association between the regulation of emotion and online social behavior, a few studies have suggested that antisocial online behavior is related to maladaptive emotion regulation. For example, previous research on the association between emotion regulation and cyberbullying has found that pre-adolescent cyberbullies consider themselves less capable of regulating their emotions (Baroncelli & Ciucci, 2014). Furthermore, adolescents who use negative emotion regulation strategies (self-blame, other-blame, rumination, and catastrophizing) to cope with anger seem to be more inclined to perform cyberbullying behavior (den Hamer & Konijn, 2016). Regarding cybervictimization, it seems that being victimized has a negative influence on subsequent emotion regulation (Feinstein, Bhatia, & Davila, 2014; Giancesini & Brighi, 2015). There is also limited evidence that emotional control (a facet of emotion regulation; the ability to manage one’s emotional responses and expression) is a risk factor for later cybervictimization (Hemphill & Heerde, 2014; Hemphill, Tollit, Kotevski, & Heerde, 2015). No research has been found on the association between emotion regulation and online prosocial behavior.

ONLINE SOCIAL BEHAVIOR AS EMOTION REGULATION?

When taking into account the findings from different studies on the association between emotional factors and online social behavior, it seems as if online antisocial and prosocial behavior sometimes function as a means to alleviate, maintain, or intensify emotions. In other words, online social behavior sometimes appears to be a tool for emotion regulation. On the one hand, negative outward-focused emotions such as anger seem to motivate online antisocial behavior (Compton et al., 2014; Gradinger et al., 2012; Kellerman et al., 2013; König et al., 2010). One explanation for why these emotions motivate online antisocial behavior could be that by acting out against others online, individuals can alleviate their negative emotional state. Indeed, previous research has shown that individuals often engage in aggression to improve their negative affective states (Bushman,

Baumeister, & Phillips, 2001). This may happen even more online than offline, as people feel less restrained when communicating via digital technologies (Suler, 2004). On the other hand, positive emotions such as happiness and gratitude might stimulate online prosocial behavior. When individuals experience positive affective states, they may maintain or even elevate their state by engaging in prosocial behavior (Wegener & Petty, 1994). Research on offline prosocial behavior has already shown that people who experience positive emotions such as happiness indeed feel more inclined to engage in prosocial behavior (Aknin, Dunn, et al., 2012). As the online disinhibition effect also stimulates online prosocial behavior (Morahan-Martin & Schumacher, 2003), the association between positive feelings and prosocial behavior might be even stronger online than offline.

Two theories are consistent with the idea that emotion regulation may be one of the processes underlying online behavior: the Social Sharing of Emotions Theory (SSET; Rimé, 2009) and Mood Management Theory (MMT; Zillmann, 1988). Firstly, according to the SSET (Rimé, 2009), individuals have the need to share and talk about their emotions. The social sharing of emotion is a process that takes place after the experience of an emotional episode and involves a description of the emotional event by one person to someone else (Rimé, 2009). A key function of the social sharing of emotion is interpersonal emotion regulation, which involves turning to others to cope with emotions (Zaki & Williams, 2013). Sharing emotions has several important individual and social consequences, such as consolidating the memory for important events, processing and completing emotional memories, and strengthening interpersonal relationships and social integration (Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998). Social sharing of emotions can take place face-to-face but also via digital communication channels, such as social network sites (e.g., Bazarova, Choi, Sosik, Cosley, & Whitlock, 2015). Sharing emotions online can provide emotional relief and increase individuals' well-being and satisfaction (Bazarova et al., 2015; Dolev-Cohen & Barak, 2013). The SSET can also explain how emotions can lead to prosocial and antisocial reactions from others. For instance, it has been shown that individuals who express their emotions too extensively or display too much negativity online, are liked less and receive less social support (Bellur, High, & Oeldorf-Hirsch, 2008; Forest & Wood, 2012). Thus, when individuals express their experienced emotions online, the content and

frequency of their communication influence the reactions they receive from others, and whether those reactions are more likely to be prosocial or antisocial. On the one hand, if individuals express their emotions online in a way that violates the implicit rules and norms of how they should express themselves online, they may elicit negative reactions from others. On the other hand, if they express their emotions in a socially accepted manner online, they may receive positive reactions and help from others, and strengthen their relationships.

Secondly, the MMT (Zillmann, 1988) posits that media messages have the potential to influence affective states and that individuals often select specific media messages to regulate their mood. Thus, another way in which individuals can use digital technologies for emotion regulation is by selecting particular media content to help them manage their mood. Media messages can alter emotional states in a positive or negative direction, depending on their content and congruence with an individual's current state. In this way, media messages can be used to regulate emotion, and individuals may actively seek out particular media messages to alter their emotional state in the desired direction (Zillmann, 1988). As a result, individuals' drive to act prosocial or antisocial online may be altered (in any direction). For example, an adolescent who has alleviated his sadness by watching a happy video online, may later log onto a social network site and start giving advice to friends rather than expressing his sadness in a status update.

Taken together, the online context offers several opportunities for intra- and interpersonal emotion regulation. Imagine an adolescent who is angry because he feels a teacher in school treated him unfairly. When he picks up his smartphone, he may seek for particular videos on Youtube that either maintain his anger or calm him down. Alternatively, he may log onto Facebook and seek for social support from a friend in a private chat conversation, or he may act out his anger either by lashing out against the teacher with insulting messages on the teacher's Facebook wall via a fake account, or by reacting with mean comments to the post of a depressed and unpopular peer who had nothing to do with his anger. Now imagine a teenager who is happy because she went ice-skating with her brother. When she turns on her computer, she may watch funny cat videos or the evening news. Alternatively, she may post many photos and videos of herself on Instagram to show everybody how amazing her

life is, or she may devote her energy to helping a classmate with his homework. Which behavior these adolescents choose will influence whether their emotions will intensify, diminish, or stay the same, and which reactions they will receive from others. In reaction to their affective state, adolescents may behave prosocially or antisocially online as an emotion regulation strategy in itself, if they do this as a means to manage their emotional state. Alternatively, they may first engage in other offline or online emotion regulation strategies, such as selecting specific media content to manage their mood, which in turn will influence which behavior they consequently display online.

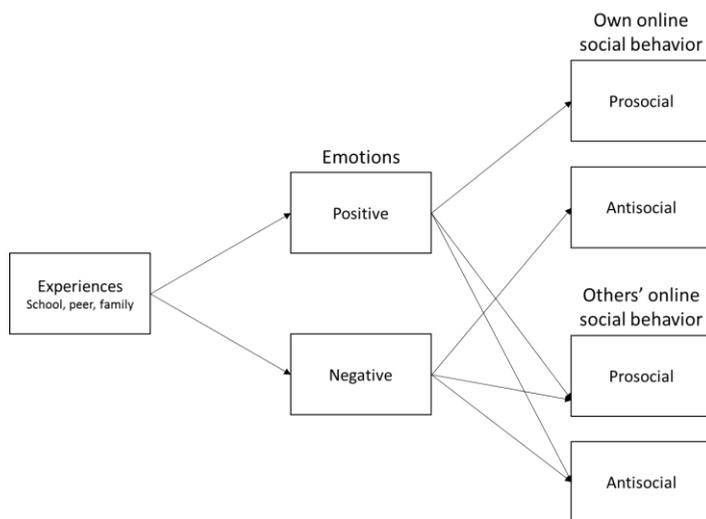


Figure 1. Conceptual model of the associations between experiences, emotions, and online social behavior. Experiences elicit emotions, which may stimulate adolescents to go online and act prosocially or antisocially towards others. Alternatively, their emotion expressions or (offline or online) behavior may elicit prosocial or antisocial online behavior of others towards them.

To summarize, the expected associations between experiences, emotions, and online social behavior are displayed in Figure 1. Emotions are elicited by experiences in several life domains (most importantly the family, school, and peer context). These emotions can be positively or negatively valenced. Positive emotions are expected to stimulate prosocial behavior (feel-good-do-good) and to elicit prosocial reactions from others (broaden-and-build). However, positive emotions may also elicit antisocial reactions, if individuals behave in a way that violates the norms of online expression (e.g., by oversharing or boasting; Waterloo, Baumgartner, Peter, & Valkenburg, 2017). Negative outward-focused emotions,

such as anger, are likely to fuel online antisocial behavior (mood alleviation) and to elicit antisocial counter-reactions from others (violence escalation cycle; Anderson, Buckley, & Carnagey, 2008). Negative inward-focused emotions, such as sadness, are expected to trigger prosocial (social support) or antisocial (“easy victim”) reactions from others.

RESEARCH FOCUS

The purpose of this dissertation is to explore the emotional dynamics behind adolescents’ online social behavior. Two central aims guide the research. Firstly, this dissertation aims to explore adolescents’ *online prosocial behavior*, in addition to their antisocial behavior. Two sub-aims are addressed, namely (a) to develop an instrument to measure adolescents’ online prosocial behavior, and (b) to use this instrument to compare adolescents’ involvement in online prosocial and antisocial behavior. Previous research on adolescents’ online social behavior has focused predominantly on antisocial behavior (cyberbullying in particular). This dissertation attempts to broaden that narrow focus by also considering adolescents’ *online prosocial* behavior. By studying both antisocial and prosocial online behavior, these behaviors can be compared in terms of prevalence and associated factors, and the relation between them can be examined.

Secondly, this dissertation aims to explore the role of *emotional processes in adolescents’ online social behavior*. Previous research has shown that involvement in antisocial online behavior, such as cyberbullying, is associated with negative affective states and anger (Ak et al., 2015; Machmutow et al., 2012; e.g., Ortega et al., 2012). However, little is known about the role of emotions in predicting cyberbullying victimization, and the processes explaining the associations between emotions and online antisocial behavior are still poorly understood. Furthermore, the link between emotions and online prosocial behavior has not been examined so far. Examining emotional processes in adolescents’ online behavior is a much-needed addition to the existing literature that has focused predominantly on the demographic, personality-related, and cognitive factors contributing to this behavior. Additionally, although there is a vast body of literature on adolescents’ emotion regulation, little research attention has been devoted to the link between emotion regulation processes and adolescents’ online social behavior. Therefore, the second aim of this dissertation is to

further explore the role of emotional processes in online behavior. Specifically, I will examine the influence of daily life factors eliciting emotions and of two affective facets, namely emotional experience and emotion regulation processes, on adolescents' online prosocial and antisocial behavior. This aim also consists of several sub-aims: (a) to examine the associations between adolescents' emotional experiences and their online behavior in the long-term and on a daily basis, (b) to explore the mediating role of emotions in the associations of personal and contextual factors (sleep quality, experienced daily life events) with adolescents' online behavior, and (c) to further examine the link between emotion regulation and online behavior.

STRUCTURE OF THE DISSERTATION

This dissertation is structured as follows (see Table 1 for an overview of the topics covered in each chapter). First, a methodological chapter describes the development and validation of a measurement instrument for online prosocial behavior (C1). This methodological research was a precondition to be able to examine the research questions on online prosocial behavior of this dissertation, because validated instruments to assess online prosocial behavior in our sample were not available. The following chapters address the main research aims of this dissertation. Chapter 2 (C2) focuses on adolescents' online prosocial and antisocial behavior and examines the longitudinal associations between these two behaviors. The following three chapters (C3-C5) examine the role of emotions in adolescents' online behavior. In Chapter 3, the focus is on anger and its mediating role in the relation between adolescents' sleep quality (another aspect of daily life functioning) and cyberbullying perpetration. Chapter 4 explores the association of positive and negative emotions with online prosocial and antisocial behavior, taking into account adolescents' use of digital media. Chapter 5 presents findings from the daily diary study on the association between happiness and online prosocial behavior in adolescents and their parents. Chapters 6 and 7 explore another aspect of emotion, namely emotion regulation. Chapter 6 discusses the moderating role of affective styles (i.e., habitual tendencies of emotion regulation) in the association between experienced events, emotions, and cybervictimization. Chapter 7 examines whether patterns of cybervictimization emerge in adolescents and adults, and links these patterns to emotion regulation strategies. The final

section of this dissertation consists of an in depth discussion and integration of the findings that this dissertation yield. It concludes with suggestions for future research and implications for practice

Table 1
Outline of the Dissertation Aims and Chapters

	C1	C2	C3	C4	C5	C6	C7
Aim 1: Explore adolescents' online prosocial behavior in addition to their antisocial behavior							
(1a) Develop an instrument to measure adolescents' online prosocial behavior	✓						
(1b) Compare adolescents' involvement in online prosocial and antisocial behavior		✓		✓	✓		
Aim 2: Explore the role of emotional processes in adolescents' online social behavior							
(2a) Examine the associations between adolescents' emotional experiences and their online behavior in the long-term and on daily basis			✓	✓	✓	✓	
(2b) Explore the mediating role of emotions in the associations of personal and contextual factors (sleep quality, experienced daily life events) with adolescents' online behavior			✓			✓	
(2c) Examine the link between emotion regulation and online behavior						✓	✓

METHODS

Two data collection methods were used in this dissertation to gather data on adolescents' daily lives, emotions, and online social behavior: a longitudinal survey (ethically approved by the University of Antwerp Ethics Committee for the Social Sciences and Humanities; SHW_14_39) and a daily diary (ethically approved by the KU Leuven Social and Societal Ethics Committee; SMEC G-2016 12 711).

LONGITUDINAL SURVEY

In order to examine the population-level associations between adolescents' daily lives, emotions, and online social behavior over time, a longitudinal survey was conducted among a large sample of Flemish adolescents. The adolescents were asked to complete the survey

three times, with an approximate six-month interval between each completion (or wave). The participants were recruited via their schools: 30 randomly selected schools from the province of Antwerp were contacted and 13 agreed to participate. All students who were in the first year of secondary education of each school were asked to participate at the first wave (March – May 2015; $N = 1,721$; $M_{\text{age}} = 13.0$ years). The second wave (October – November 2015; $N = 1,746$; $M_{\text{age}} = 13.6$ years) and third wave (March – May 2016; $N = 1,590$; $M_{\text{age}} = 14.1$ years) took place in the following school year: all students from the second year of secondary education were asked to participate in those waves, so as to maximize the likelihood that students would participate in all three waves. In total 2,168 Flemish adolescents participated across the three waves. Girls were slightly overrepresented in each wave (54-56%). The majority of the participants were in the general education track and 11 to 14% of participants were in the vocational educational track. To be able to track the participants across the waves, they were asked to provide their date of birth, their gender, and the first letter of their own first name and the first name of their father and mother. These data were not used for identification purposes; the participants' answers to the survey were treated confidentially.

The survey consisted of several sections assessing the different concepts relevant to the topic of this dissertation (i.e., daily experiences, emotions and emotion regulation, and online social behavior), supplemented with a few additional scales measuring possible confounding variables or relevant outcomes (use of digital media, face-to-face bullying experiences, sleep quality, offline behavior, self-esteem). Dependent on the schools' facilities and wishes, the surveys were completed on paper or electronically.

Because (most) students completed the survey three times in a row, it is possible to examine associations and developments across time. The longitudinal design allows for controlling for participants' prior level of a variable, which facilitates testing hypotheses about the influence of one variable on another over time.

DAILY DIARY

In order to examine the daily, within-person associations between adolescents' daily lives, emotions, and online social behavior, a daily diary study was conducted among 136 families

of employed parents with an adolescent child. 136 adolescents (67 boys, 69 girls) and 234 working parents (126 biological mothers, 96 biological fathers, four stepmothers, six stepfathers, one foster mother, and one adoption mother) participated. The children were on average 13.5 years old and the parents 44.2 years old.

This study was conducted in close collaboration with my colleague Ivana Vranjes, who simultaneously worked on a PhD-project on adult cyberbullying. Together, we designed the diary study to collect data on adolescents' and adults' online social behavior, taking into account family dynamics that might influence these behaviors.

During one week (five consecutive school or work days), the participants answered questions about their stress experiences at school or work, their emotions, and their online social behavior. Twice a day, once right after school or work and once at the adolescent's bed time, the participants received a link to an online survey, which they could complete on their smartphone or computer.

With the daily diary data, it is possible to examine daily patterns of emotions and online social behavior. Because the time span between experiencing and reporting is much smaller than in retrospective survey studies, memory and recall biases are reduced. Moreover, because the data were collected among families, influences of family members on each other can be explored.

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CHAPTER 1

DEVELOPMENT OF A MEASURE OF ADOLESCENTS' ONLINE PROSOCIAL BEHAVIOR

This chapter is based on the following publication:

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DEVELOPMENT OF A MEASURE OF ADOLESCENTS' ONLINE PROSOCIAL BEHAVIOR

Abstract

Research on adolescents' media use has focused predominantly on its negative aspects (risks) and far less on its positive side (opportunities). This is reflected in the lack of validated instruments to assess adolescents' online prosocial behavior. To address this issue, we developed the Online Prosocial Behavior Scale (OPBS) to assess adolescents' involvement in online prosocial behavior. Two subscales (performing and receiving online prosocial behavior) were constructed and their factor structure was evaluated and confirmed through parallel analysis, exploratory factor analysis, and confirmatory factor analysis. The OPBS-subscales displayed good reliability and correlated positively with offline prosocial behavior and use of digital media, supporting the scale's construct validity. Unexpectedly, the subscales also correlated positively with online antisocial behavior, which may be understood within the framework of the online disinhibition theory. The scale can be a useful tool for researchers and practitioners who need a global instrument to assess adolescents' online prosocial behavior.

INTRODUCTION

Adolescents are heavy users of digital technologies, which allow them to interact with others (Eurostat, 2015; Lenhart, 2015). Similar to offline interactions, online interactions can be positive, negative or neutral. Negative or antisocial online behaviors, such as cyberbullying, cyber harassment, and cyber aggression, have been researched extensively in recent years (Chen, Ho, & Lwin, 2015; Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Zych, Ortega-Ruiz, & Del Rey, 2015). Considerably less has been published about adolescents' online prosocial behavior. Moreover, whereas validated scales exist to measure (forms of) online *antisocial* behavior (Palladino, Nocentini, & Menesini, 2015; Patchin & Hinduja, 2015; Schultze-Krumbholz & Scheithauer, 2009; Stewart, Drescher, Maack, Ebesutani, & Young, 2014) and *offline* prosocial behavior (Caprara & Pastorelli, 1993; Caprara, Steca, Zelli, & Capanna, 2005; Carlo & Randall, 2002; Goodman, 2001; Pastorelli, Barbaranelli, Cermak, Rozsa, & Caprara, 1997), so far no validated instruments to measure *online* prosocial behavior have been developed.

Yet, online prosocial behavior is important for several reasons. First, when many people display this behavior, a social norm of positive online interactions may be established, which could be a powerful counterweight against cyberaggression (Jang, Kim, & Jung, 2016). Positive online communication may also increase social connectedness and improve relationship quality, and foster adolescents' well-being and self-esteem (Valkenburg & Peter, 2009, 2011). Taken together, online prosocial behavior may lead to positive outcomes in individual, relational, and societal domains. Therefore, our aim was to develop a measure of adolescents' online prosocial behavior, to assess the instrument's psychometric properties, convergent validity with offline prosocial behavior and use of digital media, and discriminant validity with online antisocial behavior. This empirically validated instrument will be useful to researchers and practitioners to obtain a more balanced view of how adolescents actually behave online and to discover which individual, social, and contextual factors contribute to online prosocial behavior.

PROSOCIAL BEHAVIOR IN ADOLESCENCE

Prosocial behavior is voluntary behavior carried out with the intention of benefitting particular others or promoting harmonious relationships with others (Dovidio, Piliavin, Schroeder, & Penner, 2006; Eisenberg, Fabes, & Spinrad, 2006; Van Rijsewijk, Dijkstra, Pattiselanno, Steglich, & Veenstra, 2016), such as comforting, helping, and sharing (Veenstra, 2006). Adolescence is an especially significant phase for the development of prosocial behavior. In adolescence an important shift occurs in the context in which prosocial behavior takes place: as adolescents spend increasingly more time with their peers and less time with their parents (Larson & Richards, 1991), prosocial exchanges between peers become more important (Van Rijsewijk et al., 2016). Correspondingly, in (early) adolescence, peer relationships exert an increasing influence on behavior (Brown, 2004; Gardner & Steinberg, 2005), and peers influence each other's risk-taking or antisocial, as well as prosocial behaviors (Allen & Antonishak, 2008; Brown, Bakken, Ameringer, & Mahon, 2008; van Hoorn, van Dijk, Meuwese, Rieffe, & Crone, 2016). These can be influenced directly (e.g., by encouraging each other to act prosocially) or indirectly (e.g., by group norms, expectations, or friendship closeness; Barry & Wentzel, 2006; Padilla-Walker, Fraser, Black, & Bean, 2015), and positively or negatively (van Hoorn et al., 2016).

OFFLINE PROSOCIAL BEHAVIOR

In the offline domain several validated scales have been developed to measure prosocial behavior (Caprara & Pastorelli, 1993; Caprara et al., 2005; Carlo & Randall, 2002; Goodman, 2001; Pastorelli et al., 1997). Research has generally found that offline prosocial behavior increases during adolescence (Brittian & Humphries, 2015; Fabes, Carlo, Kupanoff, & Laible, 1999) and shifts from the family to the peer context (Van Rijsewijk et al., 2016). Prosocial behavior can be based on several underlying motives, such as acting prosocially out of altruistic (selfless) reasons, behaving prosocially to gain approval and respect from others, and helping because others ask for it (Carlo & Randall, 2002).

Scholars have also examined the association between antisocial and prosocial behaviors. A negative association would seem logical, as prosocial and antisocial behavior appear to be opposites. Yet, evidence suggests that prosocial and antisocial behaviors can also be

positively associated (Boxer, Tisak, & Goldstein, 2004; Veenstra, 2006). When prosocial behavior is driven by instrumental or proactive motivations, for instance, when a person helps someone in order to get something he or she wants, it relates positively to antisocial behavior (Boxer et al., 2004). Nevertheless, most studies have examined global prosocial behavior (a person's tendency to show prosocial behavior across situations and motives) and have reported negative (but often non-significant) correlations between global measures of prosocial and antisocial behavior (Carlo, Hausmann, Christiansen, & Randall, 2003; Crick & Grotpeter, 1995; Wyatt & Carlo, 2002).

ONLINE PROSOCIAL BEHAVIOR

Although there is a fair amount of research on *offline* prosocial behavior, so far adolescents' *online* prosocial behavior has received little research attention. In analogy with the definition of offline prosocial behavior, online prosocial behavior can be defined as voluntary behavior carried out in an electronic context with the intention of benefitting particular others or promoting harmonious relations with others. This includes behavior such as comforting a friend via electronic means, online sharing of resources and information with a classmate, and helping peers out online. Small actions such as liking a friend's post and sending someone a nice message are also considered online prosocial behavior, because these actions help to maintain good relationships with others (Reich, Subrahmanyam, & Espinoza, 2012). As (offline) prosocial behavior between adolescents is mostly relational and directed towards particular others (Van Rijsewijk et al., 2016), online actions benefitting the general welfare, such as writing an article for Wikipedia, are rather categorized as a form of online civic engagement than as online prosocial behavior.

Similar to the various underlying motives for offline prosocial behavior (Carlo & Randall, 2002), it is likely that online prosocial behavior can also be driven by different motivations, and some may be facilitated or inhibited by the specific features of the online context. In particular, the potential to remain anonymous online, the possibility to reach a large audience almost instantly, the public nature of some platforms, and the lack of non-verbal cues in textual digital communication may influence people's prosocial motivations and their prosocial actions. On the one hand, the ease to act anonymously online may facilitate

anonymous prosocial behavior; and the potential to reach large audiences through social media platforms or public fora and websites may promote prosocial behavior that is motivated by the desire to gain respect and approval from others (as these platforms allow for easy public displays of prosocial actions), but also compliant prosocial behavior, when others cry out for help publicly. On the other hand, the paucity of non-verbal behavior cues in text-based digital communication may decrease empathic responses (Konrath, 2012; but see Vossen & Valkenburg, 2016) and diminish altruistically and emotionally driven prosocial behavior.

Only a few studies have examined prosocial behavior online (Bosancianu, Powell, & Bratović, 2013; Lapidot-Lefler & Barak, 2015; Wang & Wang, 2008; Wright, 2014; Wright & Li, 2011). However, most involved adult samples and none relied on tested and validated instruments to measure online prosocial behavior. Wang and Wang (2008) investigated helping behavior in online gaming among young adults. They found that helping behavior was influenced by both altruism and reciprocity (Wang & Wang, 2008). Lapidot-Lefler and Barak (2015) conducted an experiment in which they examined the effects of anonymity, invisibility, and lack of eye contact on self-disclosure and prosocial behaviors in dyads discussing a dilemma in an online chatroom. They did not find evidence for a significant effect of the online features on online prosocial behaviors. Two studies have examined the association between online and offline prosocial behavior (Bosancianu et al., 2013; Wright & Li, 2011). In a survey among young adults, Wright and Li (2011) reported that engaging in offline and online prosocial behavior was positively related. Moreover, the more time participants spent using a specific technology, the more often they behaved prosocially on that platform. Similarly, Bosancianu, Powell, and Bratović (2013) studied instrumental online prosocial behaviors (including online citizenship behaviors) among adult internet users in the Balkans and reported a close relationship between offline and online prosociality. Finally, in one study prosocial and antisocial behavior online (“cyberaggression”) were studied simultaneously. Wright (2014) conducted a longitudinal peer-nomination and self-report study among adolescents. The associations between peer-nominated and self-reported online antisocial and prosocial behavior provided mixed results, with some negative and some non-significant correlations.

The cited studies all assessed (some form of) online prosocial behavior with ad hoc created scales and items. The six-item measure of helping behavior used by Wang and Wang (2008) was an adaptation of a prosocial *values* subscale used previously in a study on citizenship behaviors of Nigerian agriculture workers (Ladebo, 2004). In the online experiment of Lapidot-Lefler and Barak (2015), prosocial behaviors specific to the experimental situation were measured using expert judges' analysis of participants' chat text, textual analysis of prosocial behavior, and self-reported prosocial behavior based on two items of a questionnaire measuring self-disclosure in online chat ("I helped the person I talked to and s/he felt it," "I helped the person I talked to without him/her noticing"). Wright and Li (2011) generated five equivalent four-item measures of prosocial behavior (one for face-to-face prosocial behavior and one for each of four technology types). These four items were also used in Wright's later study (Wright, 2014). Finally, Bosancianu, Powell, and Bratović (2013) used a self-designed 11-item scale that seemed to primarily assess instrumental helping. In sum, these studies did not use reliable and validated measures of online prosocial behavior.

THIS STUDY

To further advance the research on online prosocial behavior in adolescence, a reliable and validated instrument is needed. Therefore, this study aims to develop and psychometrically evaluate a scale to measure adolescents' online prosocial behavior. The purpose was to develop a global instrument for use in larger surveys with multiple scales so that associations with antecedents, outcomes, and other factors can be assessed, rather than to create an elaborate scale assessing all possible subtypes of online prosocial behavior. The instrument's primary aim is providing insight into the frequency of adolescents' online prosocial experiences. In order to facilitate the use of this scale in combination with measures of online antisocial behavior, which routinely measure both perpetration and victimization, two parallel subscales are created, analogous to the antisocial behavior subscales of perpetration and victimization: one for performing and one for being the recipient of online prosocial behavior. The decision to also measure experiences of being a recipient of online prosocial behavior, which is not included in most measures of offline prosocial behavior, is motivated by research showing that receiving help can produce feelings of gratitude or indebtedness, which in turn influence recipients' attitudes toward

helpers, well-being, and relational closeness to the helper (Tsang, 2006; Weinstein, DeHaan, & Ryan, 2010). Furthermore, health communication research has shown that both giving and receiving online support are important in predicting individuals' well-being and health outcomes (Han et al., 2011; Namkoong et al., 2013). In the same vein, both being the beneficiary and the benefactor of online prosocial behavior may also have important effects on individuals' well-being and relationships with others.

To assess convergent validity, we will examine the association of online prosocial behavior with two related constructs: offline prosocial behavior and digital media use. Given the connectedness between people's offline and online networks (Reich et al., 2012; Subrahmanyam, Reich, Waechter, & Espinoza, 2008) and the previously reported positive associations between offline and online prosocial behavior in adults (Bosancianu et al., 2013; Wright & Li, 2011), we hypothesize that online prosocial behavior is positively associated with offline prosocial behavior (H1). Furthermore, a precondition to be able to behave prosocially *online* is using digital media. In analogy with research on online antisocial behavior (i.e., cyberbullying) that has reported positive associations with use of digital media (Festl & Quandt, 2013, 2016; Meter & Bauman, 2015; Sticca, Ruggieri, Alsaker, & Perren, 2013; Walrave & Heirman, 2011), we hypothesize that online prosocial behavior is positively associated with the use of digital media (H2).

To assess discriminant validity, we will examine the association of online prosocial behavior with online antisocial behavior, cyberbullying, and traditional (offline) bullying. Although findings on the association between online prosocial and antisocial behavior from a previous study yielded inconsistent results (Wright, 2014), most studies on the association between offline prosocial and antisocial behavior have reported negative correlations between global measures of prosocial and antisocial behavior (Carlo et al., 2003; Crick & Grotpeter, 1995; Wyatt & Carlo, 2002). Therefore, we hypothesize that online prosocial behavior is not or negatively associated with online antisocial behavior, cyberbullying, and traditional bullying (H3).

METHOD

PROCEDURE

This study comprised two waves of data collection separated by a six-month interval, administered between March and November 2015. Participants were recruited via randomly selected schools from the province of Antwerp in Flanders, Belgium. Thirteen out of 30 contacted schools agreed to participate. Active informed consent was received from the principals and the pupils and passive consent from the participants' parents. The study received ethical approval from the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp.

Administration of the questionnaire took place in classrooms during school hours. The first data collection took place when the participants were in the first year of secondary education (grade 7) and the second wave when they were in the second year (grade 8). Only 13 pupils opted out of participation. Participants were encouraged to give verbal feedback on the items to the author when answering the questionnaire.

For the development of the scale, we followed the first five steps of the scale development process outlined by Hinkin (1998): (1) item generation, (2) questionnaire administration, (3) initial item reduction, (4) exploratory factor analysis, and (5) confirmatory factor analysis.

PARTICIPANTS

This study was part of a larger longitudinal research project on adolescents' online social behavior. Most previous studies on this topic have focused on cyberbullying, and meta-analytical findings indicate that this behavior is most prevalent during middle school age (Kowalski et al., 2014). To maximize the likelihood to observe this behavior and to enhance the comparability between participants from different schools and backgrounds, we opted to focus on a sample within this age range. In total, 1,721 adolescents (45.7% boys) participated in the first and 1,747 (45.1% boys) in the second wave. Participants' mean age was 13.01 years ($SD = 0.55$) in the first and 13.55 years ($SD = 0.55$) in the second wave. 89.3% of wave 1- and 87.6% of wave 2-participants were in the general education track, the others in the vocational education track. 79.7% of the adolescents in the second wave had also participated in the first wave. The participants who dropped out after the first wave

(19.1%) were slightly older (13.16 vs. 12.98 years; $t(408.06) = 4.77, p < .000$) and more often male (53.5% vs. 43.9%) than non-dropouts. Attrition was due to absences due to illness, and a few entire classes not participating because of practical issues during data collection (e.g., classes that were absent because of a field trip).

MEASURES

ONLINE PROSOCIAL BEHAVIOR

The generation of items started from the items used by Wright and Li (2011) (i.e., “say nice things”, “offer help”, “cheer someone up”, “let someone know I care about them”). The first item was split into two by adding “to someone” and “about someone”. The scale was then elaborated to include different types of prosocial actions and different underlying motivations, based on measures of offline prosocial behavior: the Prosocial Behavior Scale (Caprara & Pastorelli, 1993), the Prosocialness Scale for Adults (Caprara et al., 2005), and the Prosocial Behavior subscale of the Dutch Survey of Social Skills of Youngsters (Hulstijn et al., 2006). Items were selected and adapted for the online context. The focus was on prosocial interactional behaviors, therefore items reflecting empathy or related personality characteristics (e.g., “I intensely feel what others feel”), actions involving material goods or face-to-face interactions (e.g., “I hug my friends”), and social skills (e.g., “I can make friends”) were not included. This resulted in an initial pool of 14 items. Two parallel subscales were created: one for performing (POPB; e.g., “Cheer up someone”) and one for being the recipient of online prosocial behavior (ROPB; e.g., “Someone cheered me up”). The instructions were: “How often have you [done]/[experienced] the following via electronic media (smartphone, computer, tablet...) in the past month?” The response options consisted of a 5-point Likert-type scale from 1 = “Never” to 5 = “Every day”. The initial pool of items was tested for comprehension and content in a pilot study among 22 pupils in two first year classes from the lowest (i.e., vocational education) track. The pupils were asked to give their feedback about their understanding and the content of the questions and minor adjustments were made to wording. All items were retained for the main study. Cronbach’s alpha’s for the pilot study were .899 for POPB and .900 for ROPB.

OFFLINE PROSOCIAL BEHAVIOR

Offline prosocial behavior was assessed with the prosocial subscale of the Dutch version of the Strengths and Difficulties Questionnaire (e.g., “I try to be nice to other people. I care about their feelings,” “I usually share with others, for example CD’s, games, food”; Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). Participants rated how they usually behave on a 5-point Likert-type scale (1 = “I am not like that at all” to 5 = “I am exactly like that”), with higher scores representing more prosocial behavior (five items, $\alpha_{w1} = .645$, $\alpha_{w2} = .674$).

ONLINE ANTISOCIAL BEHAVIOR

Performing and receiving online antisocial behavior was assessed with the European Cyberbullying Intervention Project Questionnaire (Del Rey et al., 2015; Schultze-Krumbholz et al., 2015), measuring cyberbullying and cybervictimization (e.g., “Create a false account and pretend to be that person”). This measure was originally developed to measure cyberbullying involvement, but when potentially offensive practices are not framed within the context of cyberbullying (by mentioning the term “cyberbullying” and providing a definition), adolescents often do not perceive these practices as acts of cyberbullying (Vandebosch & Van Cleemput, 2009). Therefore, this scale was used as a broader measure of online antisocial behavior. Participants were asked to rate how often they had performed and experienced 11 acts in the past month on a 5-point Likert-type scale (1 = “Never” to 5 = “Every day”; performing: $\alpha_{w1} = .718$, $\alpha_{w2} = .771$; receiving: $\alpha_{w1} = .789$, $\alpha_{w2} = .813$).

CYBERBULLYING AND TRADITIONAL BULLYING

First, a definition of bullying was provided, highlighting the three key features of repetition, intention to hurt, and power imbalance, and distinguishing it from teasing or conflicts between friends (Olweus, 1993). Examples of bullying and cyberbullying were provided. Then, participants were asked to indicate how often they had bullied others via internet or mobile phone (cyberbullying) or in the “real” world (traditional bullying) in the past six months on a 6-point Likert scale (1 = “Never” to 6 = “Multiple times per week”).

USE OF DIGITAL MEDIA

Use of digital media was assessed with a measure on internet use of the Dutch version of the EU Kids Online Questionnaire (EU Kids Online, 2014). Participants rated how often they had performed 17 online activities (e.g., “used instant messaging”) in the past six months on a 6-point Likert-type scale (1 = “Never” to 6 = “Multiple times per day”). Two items were omitted from analysis because most respondents were not familiar with these practices and did not understand the items (“visiting chatrooms” and “using file-sharing websites”): Instant messaging has superseded visiting chatrooms, and most of our respondents did not know what file-sharing websites were. This yielded a reliable scale of 15 items ($\alpha_{w1} = .824$, $\alpha_{w2} = .796$), with higher scores representing more intensive digital media use.

RESULTS

EXPLORATORY AND CONFIRMATORY FACTOR ANALYSIS

To evaluate the relations between the items and to examine the scale’s dimensionality, exploratory factor analysis (EFA) was conducted on the data of the first wave, followed by confirmatory factor analysis (CFA) on the data of the second wave.

The items were measured on ordinal scales and showed non-normality, therefore robust weight least squares with polychoric correlations was the most suited method for the exploratory factor analysis (Barendse, Oort, & Timmerman, 2015). The software FACTOR (Lorenzo-Seva & Ferrando, 2006) was used to determine the number of factors to retain, and Mplus 7.4 (Muthén & Muthén, 2015) for the EFA and CFA. Three individuals from the first wave did not answer any of the items and were removed from analysis. Missing data were handled using pairwise deletion, based on the default setting in Mplus. Bartlett’s test of sphericity (POPB: $\chi^2 = 9935.2$, $df = 91$, $p < .001$; ROPB: $\chi^2 = 11590.4$, $df = 91$, $p < .001$) and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (both subscales: .92) supported factorability of both subscales.

Prior to the analyses, two items (“[help someone]/[someone helped me] not to get into trouble” and “[help someone]/[someone helped me] to get out of trouble”) were removed.

These items seemed to be associated more with antisocial than prosocial behavior, which some of the participants pointed out during data collection.

To determine the number of factors, parallel analysis based on principal component analysis, as suggested by Garrido, Abad, and Ponsoda (2013), was executed. The suggested number of dimensions, based on both the mean and 95 percentile of random eigenvalues, was one for both subscales.

Next, EFA with Geomin rotation was conducted using the weighted least squares means and variance adjusted (WLSMV) estimation method, which is most suitable for non-normal categorical data (Barendse et al., 2015). All items had high loadings ($> .5$) on their factor, except for two items (“share information with others”/“someone shared information with me” and “[involve someone]/[someone involved me] in a group conversation”), which demonstrated factor loadings of less than $.4$. During data collection, these items generated a lot of questions from pupils and participants often interpreted them in a negative rather than a positive way. Therefore, the EFAs were rerun without those items, yielding factor loadings that were all between $.510$ and $.885$, as can be seen in Table 1 (see Appendix for the Dutch version of the scale). The 10-item subscales demonstrated good to excellent reliability ($\alpha_{\text{POP}} = .896$; $\alpha_{\text{ROP}} = .910$). The mean scores were 3.331 ($SD = .803$) on the performing and 2.989 ($SD = .890$) on the receiving subscale. The correlation between the subscales was $.805$ ($p < .001$).

To confirm the factor structure of the scale, a confirmatory factor analysis was conducted on data from wave 2, again using WLSMV-estimation. Four participants who had not responded to any of the items were excluded, resulting in a sample size of 1,743. Missing data were handled using pairwise deletion. The CFA with the ten selected items per subscale and two factors (one for POPB and one for ROPB) revealed significant, moderate to high standardized loadings (between $.568$ and $.873$) of the items on their respective factor, but the model did not fit the data well ($\chi^2(169) = 6477.247$, $p < .001$; CFI = $.881$; TLI = $.866$; RMSEA = $.146$ [$.143$, $.149$]). However, this model was very restrictive as it did not allow any covariations between item errors. The items of the subscales mirror each other, with each item having two versions (one on performing, one on receiving). Furthermore, items 1 and

2 (say nice things [to]/[about] someone) are similar in their wording, and item 9 and 10 (“support someone” and “comfort someone”) are closely related in meaning. Therefore, correlated errors for the mirrored and related items were allowed in a less restrictive model, which had an acceptable fit ($\chi^2(155) = 1603.920$, $p < .001$; CFI = .973; TLI = .966; RMSEA = .073 [.070, 0.077])¹. The standardized factor loadings are presented in Table 1.

To further evaluate the factorial validity of the scale, we split the sample in boys and girls to test for measurement invariance across gender. The model fit statistics indicated scalar invariance across the groups, as this model had the best fit and the change in CFI was smaller than .01 (Cheung & Rensvold, 2002): configural invariance model $\chi^2(230) = 1776.253$, CFI = .970, TLI = .964, RMSEA = .074; metric invariance model $\chi^2(212) = 1752.989$, CFI = .971, TLI = .967, RMSEA = .071; scalar invariance model $\chi^2(154) = 1730.731$, CFI = .973, TLI = .973, RMSEA = .063. Furthermore, the reliability statistics differed only slightly between the groups: POPB $\alpha_{\text{boys}} = .903$, $\alpha_{\text{girls}} = .877$; ROPB: $\alpha_{\text{boys}} = .910$, $\alpha_{\text{girls}} = .894$.

CONSTRUCT VALIDITY

Associations between the two subscales of the OPBS and the measures of offline prosocial and online antisocial behavior, cyberbullying and traditional bullying, and digital media use, were computed to assess convergent and discriminant validity (see Table 2). As predicted by hypotheses 1 and 2, correlations with offline prosocial behavior and digital media use were significantly positive. Hypothesis 3 was only partly confirmed: POPB and ROPB were not correlated with traditional bullying, but they were positively (albeit weakly) correlated with online antisocial behavior and cyberbullying.

Table 1
Factor Loadings and Descriptives of the Online Prosocial Behavior Subscales from EFA on Wave 1 (N = 1,718) and CFA on Wave 2 (N = 1,743)

	Item	Factor loadings		Mean		SD	
		EFA	CFA	W1	W2	W2	W2
		W1	W2	W1	W2	W2	W2
1.	Say nice/friendly things to someone	.793	.770	3.494	3.512	1.032	0.955
	Someone said nice/friendly things to me	.885	.839	3.199	3.209	1.095	1.032
2.	Say nice/friendly things about someone	.759	.717	3.127	3.157	1.067	1.045
	Someone said nice/friendly things about me	.865	.770	2.859	2.812	1.130	1.111
3.	Help someone or offer to help	.699	.655	3.196	3.111	1.078	1.025
	Someone helped me or offered help	.709	.707	2.714	2.688	1.162	1.107
4.	Cheer up someone	.743	.782	3.474	3.375	1.068	1.059
	Someone cheered me up	.747	.785	3.159	3.130	1.211	1.177
5.	Let someone know that you like him/her	.729	.770	3.170	3.151	1.351	1.276
	Someone let me know that he/she likes me	.769	.808	3.011	3.051	1.331	1.225
6.	Let know that you like something (e.g., like something, send a smiley...)	.510	.579	3.968	4.088	1.122	1.095
	Someone let me know that he/she liked something I did (e.g., liked something, sent a smiley)	.590	.618	3.445	3.483	1.256	1.207
7.	Compliment or congratulate someone	.757	.768	3.505	3.442	1.008	0.994
	Someone complimented or congratulated me	.766	.771	3.095	3.055	1.101	1.052
8.	Help someone with his/her school work	.536	.571	3.000	3.104	1.120	1.050
	Someone helped me with my school work	.555	.548	2.780	2.902	1.180	1.121
9.	Support someone	.876	.806	3.357	3.255	1.112	1.061
	Someone supported me	.883	.789	2.976	2.940	1.224	1.172
10.	Comfort/console someone	.852	.764	3.017	2.908	1.195	1.138
	Someone comforted/consolated me	.848	.737	2.638	2.612	1.284	1.223

Note. All factor loadings are significant ($p < .01$). EFA loadings are Geomin-rotated, CFA loadings are standardized. W1 = wave 1; W2 = wave 2; SD = standard deviation.

Table 2
Correlations

Measure	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. W1 POPB	--															
2. W1 ROPB	.878***	--														
3. W1 Offline PB	.434***	.364***	--													
4. W1 POAB	.237***	.224***	-.410***	--												
5. W1 ROAB	.351***	.257***	-.172***	.685***	--											
6. W1 DMU	.389***	.395***	-.028	.431***	.315***	--										
7. W1 CBP	.106**	.129**	-.383***	.639***	.492***	.260***	--									
8. W1 TBP	.010	.005	-.324***	.514***	.385***	.127**	.707**	--								
9. W2 POPB	.713***	.642***	.636***	.162***	.243***	.307***	.058	.006	--							
10. W2 ROPB	.633***	.689***	.308***	.167***	.161***	.306***	.094	.018	.894***	--						
11. W2 Offline PB	.218***	.187***	.849***	-.429***	-.219***	-.080*	-.363***	-.280***	.373***	.290***	--					
12. W2 POAB	.209***	.212***	-.276***	.763***	.561***	.297***	.520***	.404***	.254***	.244***	-.430***	--				
13. W2 ROAB	.256***	.165***	-.097*	.462***	.641***	.256***	.423***	.343***	.239***	.202***	-.251***	.758***	--			
14. W2 DMU	.307***	.314***	-.062	.418***	.303***	.698***	.297***	.171***	.454***	.433***	-.165***	.495***	.393***	--		
15. W2 CBP	.134**	.159**	-.216**	.571***	.445***	.275***	.683***	.649***	.053	.108**	-.396***	.638***	.534***	.385***	--	
16. W2 TBP	.069	.093	-.178**	.559***	.382***	.244***	.590***	.696***	.036	.059	-.323**	.582***	.433***	.326***	.771***	--
<i>M</i>	3.336	2.996	2.533	1.228	1.220	3.016	1.136	1.189	3.309	2.986	2.485	1.215	1.202	3.063	1.189	1.127
<i>SD</i>	0.807	0.893	0.367	0.307	0.346	0.933	0.489	0.591	0.789	0.852	0.405	0.310	0.333	0.780	0.476	0.494

Note. POPB = performing online prosocial behavior, ROPB = receiving online prosocial behavior, PB = prosocial behavior, POAB = performing online antisocial behavior, ROAB = receiving online antisocial behavior, DMU = digital media use. * $p < .05$, ** $p < .01$, *** $p < .001$

DISCUSSION

This article aimed to develop a global scale to measure adolescents' engagement in online prosocial behavior. Based on instruments of offline prosocial behavior and items used in previous research about online prosocial behavior, two subscales were constructed to assess how often adolescents perform and are the subject of ("receive") online prosocial behavior. To evaluate the scale's validity, the associations of these subscales with offline prosocial behavior, online antisocial behavior, and use of digital media were examined.

Parallel analysis of the two subscales suggested that they represent one-dimensional constructs. After exploratory factor analysis, ten items were retained for each subscale. The factor structure of the scale was confirmed through confirmatory factor analysis. As hypothesized, the subscales correlated positively with offline prosocial behavior and use of digital media, supporting convergent validity of the OPBS. Contrary to hypothesis 3, weak but significant correlations were also found between online prosocial and antisocial behavior and cyberbullying. Although unexpected, previous research on offline social behaviors has sometimes also found that prosocial and antisocial behavior are positively related, when the motivation underlying the prosocial behavior is instrumental or proactive (Boxer et al., 2004; Veenstra, 2006). Because our global measure of online prosocial behavior was not designed to identify the motivations underlying this behavior, unfortunately we have no information about the reasons behind the respondents' behavior. However, this positive association with online antisocial behavior might indicate that self-interest can be an important motivator of online prosocial behavior. Alternatively, individuals who spend more time online are likely to be engaged more in social interactions online overall, prosocial as well as antisocial. The fact that the OPBS is not correlated with traditional bullying supports this idea.

Another possible explanation for the positive association between online prosocial and antisocial behavior could be that increased prosocial behavior towards one's in-group is associated with increased antisocial behavior towards one's out-group. Social identity theory (Tajfel & Turner, 1979) posits that people's sense of self depends on the groups to which they belong. When people perceive themselves as part of a group, this becomes an in-group for them, whereas other groups to which they do not belong, are out-groups. This

in-group versus out-group phenomenon entails favoring the in-group over the out-group, which might translate into increased prosocial behavior towards the in-group and increased antisocial behavior towards the out-group. Therefore, future research could benefit from taking into account with whom people are interacting when they behave prosocially or antisocially online.

LIMITATIONS AND FUTURE DIRECTIONS

Some limitations can be formulated for this study. First, although the measure of offline prosocial behavior was validated and previously used with similar samples, it demonstrated low reliability in this study (as indicated by Cronbach's $\alpha < .70$). However, previous research with the Dutch *SDQ* yielded similarly low alpha-values (Muris, Meesters, & van den Berg, 2003). In future research using more reliable scales of offline prosocial behavior, the reported correlations with the OPBS can be confirmed with more certainty.

Second, a social desirability bias may have inflated the scores on the OPBS, because the adolescents may have wanted to present themselves in a positive light. We tried to address this by emphasizing anonymous participation. Further, the items of the OPBS and the European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Schultze-Krumbholz et al., 2015) were presented together (mixed) so that it was not obvious which items addressed positive or socially desirable behaviors and which negative ones.

Third, as the aim of the study was to develop a global measure of online prosocial behavior, we did not attempt to distinguish between subtypes of prosocial behavior. However, research on offline prosocial behavior has suggested different subtypes of this behavior that are differently related to antisocial behavior (Boxer et al., 2004; McGinley & Carlo, 2007). Therefore, if researchers are particularly interested in the motivations underlying online prosocial behavior (e.g., altruistic or egoistic), the OPBS might not be sufficient. Our scale, together with scales measuring subtypes of offline prosocial behavior (Carlo & Randall, 2002) and theoretical models of prosocial behavior, such as the empathy-altruism hypothesis (Batson, 2011), could be used as an inspiration for the development of a more elaborate measure on subtypes of online prosocial behavior.

Fourth, the scale development process, as outlined by Hinkin (1998), consists of a sixth step, replication. We encourage the administration of our scale in other samples to confirm the generalizability of this new instrument.

Finally, future studies could examine the convergent validity of the OPBS further by correlating adolescents' self-ratings with other-ratings or with observational analyses of their actual online behavior. Explorations of correlations of the OPBS with related constructs, such as online civic engagement, and with more elaborate measures of adolescents' offline antisocial behavior, could provide added support for the instrument's discriminant validity.

NOTES

¹ Because CFA is based on a restrictive measurement model which specifies a simple structure, allowing no cross-loadings and no within scale correlated residuals (Asparouhov, Muthén, & Muthen, 2009), subtle nuances in the data (such as variations in correlations between scale items) are not taken into account, which might explain why the fit of the model is not better.

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APPENDIX

Original (Dutch) version of the OPBS

Performing

1. Lieve/vriendelijke dingen zeggen *tegen* iemand
2. Lieve/vriendelijke dingen zeggen *over* iemand
3. Iemand helpen of voorstellen om te helpen
4. Iemand opvrolijken
5. Iemand laten weten dat je om hem/haar geeft
6. Laten weten dat je iets leuk vindt (bv. iets liken, smiley sturen,...)
7. Iemand een compliment geven of feliciteren met iets
8. Iemand helpen bij schoolwerk (bv. door notities te delen, tips uit te wisselen,...)
9. Iemand steunen
10. Iemand troosten

Receiving

1. Iemand zei lieve/vriendelijke dingen *tegen* mij
2. Iemand zei lieve/vriendelijke dingen *over* mij
3. Iemand hielp mij of stelde voor om mij te helpen
4. Iemand vrolijkte me op
5. Iemand liet weten dat hij/zij om me geeft
6. Iemand liet weten dat hij/zij iets dat ik deed leuk vindt (bv. iets liken, smiley sturen,...)
7. Iemand gaf mij een compliment of feliciteerde me met iets
8. Iemand hielp me bij schoolwerk (bv. door notities te delen, tips uit te wisselen,...)
9. Iemand steunde me
10. Iemand troostte me

CHAPTER 2

POSITIVE OR NEGATIVE SPIRALS OF ONLINE BEHAVIOR? EXPLORING RECIPROCAL ASSOCIATIONS BETWEEN BEING THE ACTOR AND THE RECIPIENT OF PROSOCIAL AND ANTISOCIAL BEHAVIOR ONLINE

This chapter is based on the following publication:

Erreygers, S., Vandebosch, H., Vranjes, I., Baillien, E., & De Witte, H. (2017). Positive or negative spirals of online behavior? Exploring reciprocal associations between being the actor and the recipient of prosocial and antisocial behavior online. *New Media & Society*. doi:10.1177/1461444817749518

POSITIVE OR NEGATIVE SPIRALS OF ONLINE BEHAVIOR? EXPLORING RECIPROCAL ASSOCIATIONS BETWEEN BEING THE ACTOR AND THE RECIPIENT OF PROSOCIAL AND ANTISOCIAL BEHAVIOR ONLINE

Abstract

Bidirectional associations between being cyberbullied and cyberbullying others have been suggested, as well as bidirectional patterns of being the benefactor and beneficiary of online prosocial behavior (reciprocity). However, so far these relations have been studied as population-level associations, and it is not clear whether they also reflect within-person behavioral patterns. Therefore, this study aimed to disentangle between- and within-person processes in online antisocial (cyberbullying perpetration and victimization) and prosocial behavior (receiving and performing online prosocial behavior) over time. Random intercept cross-lagged panel models were used to examine long-term within-person patterns of involvement in cyberbullying on the one hand and online prosocial behavior on the other hand. The findings showed no within-person effects between cyberbullying victimization and perpetration over time. In contrast, results did reveal significant within-person autoregressive effects of performing and receiving online prosocial behavior over time, and within-person cross-lagged effects between receiving online prosocial behavior and acting prosocially later on. These results indicate long-term positive, reinforcing spirals of prosocial exchanges, but no long-term negative spirals of cyberbullying perpetration and victimization.

INTRODUCTION

In the last decades, digital technologies have created new opportunities for social behavior, which can now also take place online. Accordingly, online forms of social behavior have emerged, such as cyberbullying. A large and growing body of literature has examined cyberbullying and the factors related to it; and a few studies have investigated and confirmed the association between cyberbullying victimization and perpetration (Ak, Özdemir, & Kuzucu, 2015; Festl & Quandt, 2016; Festl, Scharnow, & Quandt, 2015; Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Schultze-Krumbholz et al., 2015; Vandebosch & Van Cleemput, 2009; Walrave & Heirman, 2011; Wright & Li, 2013). However, questions remain about the causal and temporal direction of the association at the level of the individual (i.e., do cyberbullies become cybervictims, or vice versa?).

The link between performing and experiencing a behavior has not only been shown for antisocial behavior, such as bullying and aggression, but also for prosocial behavior, such as in reciprocal helping (Trivers, 1971). *Online* prosocial behavior has received much less research attention than its counterpart – online antisocial behavior.¹ Although some studies have examined online prosocial behavior in specific contexts, such as couchsurfing (Lauterbach, Truong, Shah, & Adamic, 2009) and online gaming communities (Nelson & Rademacher, 2009), no previous research has examined associations over time between being a recipient and being an actor of general online prosocial behavior. Moreover, at present cyberbullying and online prosocial behavior have not been studied simultaneously, although studies on offline social behavior have examined bullying and prosocial behavior together (Menesini & Camodeca, 2008; Warden & Mackinnon, 2003). Therefore, in this study we aim to shed light on the longitudinal within- and between-person dynamics of online antisocial and prosocial behavior by examining the associations between cyberbullying victimization and perpetration on the one hand, and receiving and performing online prosocial behavior on the other hand, using random-intercept cross-lagged panel modeling.

In what follows, we first review the literature on cyberbullying victimization and perpetration, and on prosocial behavior. Then we discuss how the associations between performing and experiencing these behaviors have been analyzed so far and what the

added value of using random-intercept cross-lagged panel modeling is. This is followed by a detailed discussion of the methods and the results of this study.

CYBERBULLYING VICTIMIZATION AND PERPETRATION

Cyberbullying is intentional negative behavior that occurs via electronic technologies (Smith et al., 2008). An extensive body of literature has explored cyberbullying and its associated antecedents and consequents (for a meta-analysis, see Kowalski et al., 2014). Some of these studies have examined the relationship between victimization and perpetration of cyberbullying, and most suggest a positive association (Ak et al., 2015; Festl & Quandt, 2016; Festl et al., 2015; Kowalski et al., 2014; Schultze-Krumbholz et al., 2015; Vandebosch & Van Cleemput, 2009; Walrave & Heirman, 2011; Wright & Li, 2013). Notably, individuals who are both victim and perpetrator of cyberbullying (often called *bully-victims* or *aggressive victims*) seem to fare worse psychologically than “pure” cyberbullying victims or bullies (Bayraktar, Machackova, Dedkova, Cerna, & Ševčíková, 2014; Sourander et al., 2010; Völlink, Bolman, Dehue, & Jacobs, 2013).

Although there is evidence for a link between cyberbullying perpetration and victimization, the dynamics behind this association have not been fully uncovered. One suggested explanation is that cybervictims take revenge or retaliate and turn against the bully (König, Gollwitzer, & Steffgen, 2010). Cybervictims may experience anger and frustration, and as some form of maladaptive coping strategy, may turn to cyberbullying as a way to vent their negative feelings.

Additionally, when someone cyberbullies others, this may lead to that person becoming a target of cyberbullying him- or herself, resulting in cycles of cyberbullying (Kowalski, Limber, & Agatston, 2012). Hence, the association between cyberbullying and cybervictimization could be bidirectional. Bidirectionality of aggressive acts is postulated in the General Aggression Model (GAM, Anderson & Bushman, 2002) as one of the mechanisms behind violence. The General Aggression Model is a comprehensive framework that integrates the role of social, cognitive, personality, developmental, and biological factors to explain aggression (Allen, Anderson, & Bushman, 2018). According to the GAM, aggression can be understood as a combination of distal and proximate processes. Distal processes involve a

combination of biological and persistent environmental processes, which can influence personality through altering knowledge structures, and thereby shape proximate processes (Anderson & Bushman, 2002). Proximate processes operate during specific aggressive episodes in three stages, namely inputs, routes, and outcomes (Anderson & Bushman, 2002). Person and situation factors serve as inputs which influence appraisal and decision processes (outputs) through present internal state variables (cognition, affect, and arousal). These appraisal and decision processes can guide aggressive or non-aggressive actions, which can in their turn reshape the person and situation inputs, leading to a new cycle of proximate processes (Allen et al., 2018). According to the GAM, “most acts of violence result from a series of conflict-based interactions that involve two (or more) parties trading retaliatory behaviors in an escalating cycle” (Anderson, Buckley, & Carnagey, 2008, p. 463). One person’s retaliation provokes a retaliatory reaction from the other, resulting in an escalating cycle of aggression, a so-called violence escalation cycle (Anderson et al., 2008). Applied to cyberbullying, the violence escalation model predicts that a triggering event (e.g., a provocation online from person A) that is perceived as intentional, harmful, or unjustified, may elicit an aggressive online response from person B, which in turn provokes a retaliatory reaction from person A, and so on, developing into a reinforcing cycle of cybervictimization and cyberperpetration. However, (cyber)bullying is a special type of aggression, characterized by a power imbalance between the victim and the bully. Therefore, in (cyber)bullying the likelihood that the victim retaliates against the bully may be smaller, because the bully is (perceived as) more powerful. Nevertheless, this does not preclude that a (cyber)victim would react aggressively towards another person than the original perpetrator (as some form of indirect retaliation). Furthermore, because of the possibility to act anonymously online, retaliation might be easier in cyberbullying than in offline bullying. Also, the online disinhibition effect (Suler, 2004), which describes the lowered restraint people experience in online versus offline communication, may lower the threshold to retaliate online versus offline.

PROSOCIAL BEHAVIOR: DYNAMICS AND ONLINE MANIFESTATIONS

Antisocial behavior, such as cyberbullying, is behavior that harms or lacks consideration for the welfare of other people. Yet people also often behave in ways that promote others’

well-being. Prosocial behavior is voluntary behavior that is aimed to benefit particular others or to promote harmonious relationships (Dovidio, Piliavin, Schroeder, & Penner, 2006; Eisenberg, Fabes, & Spinrad, 2006; Van Rijsewijk, Dijkstra, Pattiselanno, Steglich, & Veenstra, 2016). Helping, comforting, or sharing resources with others are ways of behaving prosocially.

Cyclic patterns of behavior have not only been investigated in the domain of antisocial behavior; cycles of prosocial behavior have also been reported (Bartlett & DeSteno, 2006; Keysar, Converse, Wang, & Epley, 2008; Stanca, 2009). Chains of positive exchanges between individuals are examined under the umbrella of “reciprocity”.² Two forms of reciprocity have been distinguished: direct and indirect reciprocity (Rankin & Taborsky, 2009; Roberts, 2008). Direct reciprocity entails “paying it back”: returning a favor after having received one. Indirect or generalized reciprocity entails “paying it forward”: doing someone a favor after having received one from someone else, or doing a favor to someone who has helped someone else. The existence of both forms of reciprocity has been established in experimental research (Bartlett & DeSteno, 2006; Gray, Ward, & Norton, 2014; Rankin & Taborsky, 2009). Furthermore, there are some indications that generalized reciprocity also occurs online (Lauterbach et al., 2009; McLure Wasko & Faraj, 2000; Nelson & Rademacher, 2009). Moreover, research on cooperative behavior in the specific context of video game playing has reported that playing violent video games cooperatively may increase later helping and cooperative behavior (Ewoldsen et al., 2012; Greitemeyer & Cox, 2013; Velez, Mahood, Ewoldsen, & Moyer-Gusé, 2014).

Two theories may be drawn upon to explain these findings: the theory of bounded generalized reciprocity (Yamagishi, Jin, & Kiyonari, 1999) and the reinforcing spirals model (Slater, 2007). According to the theory of bounded generalized reciprocity (Yamagishi et al., 1999), people’s prosocial behavior in social interactions in groups is influenced by their expectations of positive and reciprocal behaviors (i.e., generalized reciprocity) from other group members. When people expect others to behave positively and to reciprocate favors, it is in their self-interest to behave positively themselves and to reciprocate these favors to other group members. If they don’t, they risk being perceived as a freeloader and this diminishes their likelihood to receive favors from anyone else in the group. The theory of

bounded generalized reciprocity predicts that when people perceive a norm of generalized reciprocity, for example, by observing others behave prosocially or by being treated positively by others, they will behave prosocially themselves. In this way, reinforcing sequences of being the recipient and the actor of online prosocial behavior may develop. Applied to online contexts, this phenomenon can also manifest itself, especially in contexts in which group membership is salient, such as on social network sites and in group chat conversations. As group membership shapes reciprocal behavior and social media facilitate group communication (Lai & Turban, 2008), norms of reciprocal prosocial behavior may quickly develop in online social networks when people witness others behaving prosocially or are the recipient of prosocial behavior themselves and feel that it is expected of them to do the same. This process may even be more widespread online than offline, because online actions have the potential to reach a wider audience and to be witnessed long after they have actually taken place, compared to offline actions, which can only be witnessed by the people present at that particular place and time.

Alternatively, the reinforcing spirals model (Slater, 2007) proposes that media use affects individuals' attitudes and behavior, which in their turn influence subsequent media use through selection and attention processes, resulting in a spiral that is mutually reinforcing over time. Applying this theory to online social behavior, it predicts that adolescents' exposure to computer-mediated interactions influences their own cognitions and behaviors related to normative online behavior and shapes their subsequent computer-mediated interactions. Regarding online prosocial behavior, it could be that when adolescents experience social support and recognition from peers online, these experiences stimulate them to interact more frequently with those peers (selection effect) and reciprocate their behavior, resulting in a positive reinforcing cycle of prosocial interactions. So far, a few studies (cited above) have provided indications for the existence of reciprocity online in specific contexts (online video game communities, freecycle communities, couchsurfing.com); however, to the best of the authors' knowledge, no previous research has directly examined *general* online prosocial behavior in terms of associations between being a recipient and being an actor of that behavior. With *general* online prosocial

behavior, we refer to online prosocial interactions between peers, such as comforting or complimenting others through online messages.

ANALYSIS OF THE DYNAMICS OF ONLINE SOCIAL BEHAVIOR

So far, online antisocial and prosocial behavior have mainly been studied independently, in different research disciplines and populations, and with differing methods. Online prosocial behavior has often been studied either with experimental research, by observing people's behavior in social exchange contexts (e.g., Stanca, 2009), or with questionnaires, interviews or focus groups, by asking participants what drives their actions online (e.g., Lauterbach et al., 2009).

With regard to online antisocial behavior, the cyberbullying-cybervictimization relationship has mainly been analyzed in cross-sectional studies, investigating the rates of individuals reporting to be involved both as perpetrator and as victim, or assessing correlations between cyberperpetration and cybervictimization. These types of analysis focus on interindividual variation and yield between-subject or population-level associations (Molenaar & Campbell, 2009). Specifically, a positive cross-sectional correlation indicates that individuals who cyberbully others more than the group average, are also more often than average victimized online. However, drawing inferences from patterns observed *between* persons to patterns *within* persons over time is not warranted (Kievit, Frankenhuis, Waldorp, & Borsboom, 2013; Molenaar & Campbell, 2009). Cross-sectional population-level associations do not shed light on the causal and temporal direction of the association at the individual (or within-person) level (i.e., do cyberbullies become later cybervictims, or vice versa?). To examine within-individual associations and processes over time, longitudinal data are needed.

TRADITIONAL LONGITUDINAL METHODS: CROSS-LAGGED PANEL MODELS

Fortunately, some cyberbullying studies have used longitudinal data to examine the cybervictimization-cyberperpetration association over time, and these could provide more insight into the sequence of behaviors. Several of these studies have used traditional cross-lagged panel structural equation models as method of analysis (Barlett & Gentile, 2012; Espelage, Rao, & Craven, 2013; Pabian & Vandebosch, 2015; van den Eijnden, Vermulst, van

Rooij, Scholte, & van de Mheen, 2014). Cross-lagged panel models (CLPM) are often used to study the influence of two variables measured on more than one occasion on each other over time. In these models, each variable is regressed on its own previous score and on the other variable's previous score. This results in two types of regressions: autoregressive and cross-lagged. Autoregressive paths are believed to represent the stability of a variable over time. Cross-lagged paths are believed to represent the association between two variables over time (or the change in one variable related to the previous score on the other variable), controlling for the stability of the constructs involved. By comparing the relative strength of the (standardized) cross-lagged regression coefficients, researchers estimate which variable has the strongest causal influence.

With regard to cyberbullying, significantly positive autoregressive relations for cyberperpetration and cybervictimization, interpreted as stability over time, have consistently been reported (Barlett & Gentile, 2012; Espelage et al., 2013; Pabian & Vandebosch, 2015; van den Eijnden et al., 2014). The findings for cross-lagged relations from cyberperpetration to cybervictimization and vice versa are mixed. One study among university students reported positive cross-lagged associations in both directions (Barlett & Gentile, 2012); two studies among middle school students found positive cross-lagged associations between cybervictimization and cyberperpetration but not the other way around (Barlett & Wright, 2017; Espelage et al., 2013); another study did not report significant cross-lagged associations (Pabian & Vandebosch, 2015); and a final study among adolescents found a negative association between cybervictimization and cyberperpetration (van den Eijnden et al., 2014), although the authors noted that this could be an artifact of their multivariate analysis.

With regard to online prosocial behavior, to the best of the authors' knowledge, so far cross-lagged panel models have not yet been used to study the long-term dynamics of this behavior.

ALTERNATIVE LONGITUDINAL METHODS: RANDOM-INTERCEPT CROSS-LAGGED PANEL MODELS

CLPM are attractive because they seem to provide insight into the causal processes between variables, accounting for their stability over time. However, these models have

been criticized for not accounting for ‘the right type of stability’ (Hamaker, Kuiper, & Grasman, 2015, p. 102). Hamaker et al. (2015) argue that autoregressive parameters fail to control for trait-like, time-invariant stability in the constructs. The autoregressive parameters in CLPM only account for temporal stability, not trait-like, time-invariant stability of constructs. In this way, it is not possible to separate within-person variability from between-person variability, and only between-person variability is estimated. This may result in invalid conclusions regarding the causal processes involved, as the CLPM-parameter estimates only reflect inter-individual, rather than intra-individual processes.

Applied to cyberbullying, using traditional CLPM assumes that there are no trait-like, time-invariant individual differences at play in cyberbullying involvement. This seems a questionable assumption, as research on bullying has shown stable individual differences in involvement in bullying. For instance, regarding victimization, some people are never bullied, whereas others are chronically victimized (Barker, Arseneault, Brendgen, Fontaine, & Maughan, 2008; Bowes et al., 2013; Smokowski, Evans, & Cotter, 2014). Moreover, victimization and perpetration can be predicted by (stable) personal and family features (Ang, 2015; Arseneault, Bowes, & Shakoor, 2010; Guo, 2016).

Similarly, prosocial behavior is associated with stable individual characteristics such as intelligence and temperamental features (Veenstra, 2006) and shows consistent between-person differences (Eisenberg et al., 2002).

It is important to take those stable inter-individual differences into account in order to disentangle between-person effects (e.g., pooled across all people, are cybervictimization and cyberperpetration associated over time) and within-person effects (e.g., does being victimized increase the likelihood of cyberbullying others over time and vice versa). In this regard, Hamaker et al. (2015) have proposed an alternative to the traditional CLPM, called the random-intercept cross-lagged panel model (RI-CLPM), which includes a random intercept to account for invariant, trait-like stability in the involved constructs (i.e., between-person effects), in addition to temporal stability. The RI-CLPM takes into account the multilevel structure of longitudinal data, namely that measurement occasions are nested within individuals, and separates the within-person level from the between-person

level. This model does make it possible to separately assess within-person and between-person variability over time, and allows for more accurate estimates of within-person change and stability (Hamaker et al., 2015). The RI-CLPM has already been applied in studies on perceived social support and posttraumatic stress (Birkeland, Knatten, Hansen, Hem, & Heir, 2016), parental monitoring and adolescent problem behavior (Keijsers, 2016), and health anxiety and online information seeking (te Poel, Baumgartner, Hartmann, & Tanis, 2016), but to the best of our knowledge not to online antisocial or prosocial behavior.

THIS STUDY

In the present study, we aim to shed light on the within- and between-person dynamics of online antisocial and prosocial behavior among adolescents. We focus on cyberbullying as a proxy of online antisocial behavior, because the majority of research about online antisocial behavior has been conducted on cyberbullying, and previous studies on offline social behavior have also contrasted prosocial behavior with bullying (Menesini & Camodeca, 2008; Warden & Mackinnon, 2003). Although a large body of research has explored the interindividual processes, there remains a paucity of research on the intraindividual processes behind cyberbullying. Moreover, very little attention has been paid to adolescents' online prosocial behavior and the dynamics behind it.

Therefore, this study explores the dynamics behind adolescents' online social behavior by examining the associations between cyberbullying victimization and perpetration on the one hand, and receiving and performing online prosocial behavior on the other hand, using random intercept cross-lagged panel models. To this aim, we conducted a three-wave panel study among 12-14-year-old adolescents. This population was selected because research has shown that cyberbullying shows a peak during adolescence (Barlett & Coyne, 2014; Pabian & Vandebosch, 2016) and that significant developments in prosocial behavior take place during this life phase (van Hoorn, van Dijk, Meuwese, Rieffe, & Crone, 2016). Based on previous research findings and propositions of the General Aggression Model (Anderson & Bushman, 2002), the theory of bounded generalized reciprocity (Yamagishi, Jin, & Kiyonari, 1999), and the reinforcing spirals model (Slater, 2007), we propose the following hypotheses:

H1. Cyberbullying victimization (resp., perpetration) increases subsequent cyberbullying perpetration (resp., victimization).

H2. Receiving (resp., performing) online prosocial behavior increases subsequent performing (resp. receiving) of online prosocial behavior.

METHOD

PROCEDURE

This study comprised three data collection waves separated by a six-month time lag, administered between March 2015 and May 2016. To recruit participants, 30 randomly selected secondary education schools from one province in Flanders, Belgium were asked to participate and 13 schools consented. In each school, all the students from the first year (equivalent to US grade 7) participated in the first wave, and all the students from the second year in the second and third wave (because a new school year started after the first wave). The school principals and the students provided active consent, and the students' parents provided passive consent. Of all the students who were asked to participate, 13 did not provide consent themselves or did not receive consent from their parents to participate. The Ethics Committee for the Social Sciences and Humanities of the University of Antwerp provided ethical approval for the study.

The participants completed a questionnaire in their classrooms during school hours, either on paper or electronically, in the presence of the first author and/or school personnel. In classes where the author was not present during administration, the school personnel was thoroughly informed about the survey procedures. Participants were encouraged to ask questions and to signal any items that were unclear during administration. They were informed that their data would be treated confidentially. To be able to link participants' data from the three waves, a few biographical questions were asked (e.g., the first letter of their mother's name), but these data were not coupled to their answers on the survey.

PARTICIPANTS

The total number of participants was 2,168. In the first wave, 1,721 students (45.7% boys) participated, 1,746 (45.1% boys) in the second wave, and 1,590 (44.3% boys) in the third wave. Practical issues in data collection led to the non-participation of four classes in the first wave, two classes in the second wave, and eight classes in the third wave. Participants' mean age was 13.01 ($SD = 0.55$) in the first, 13.55 ($SD = 0.55$) in the second, and 14.08 ($SD = 0.56$) in the third wave. The majority of the participants were in general education, and 11 to 14% of participants in vocational education.

MEASURES

CYBERBULLYING PERPETRATION AND VICTIMIZATION

The European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Del Rey et al., 2015; Schultze-Krumbholz et al., 2015) was used as measure of cyberbullying perpetration (CBP) and victimization (CBV). For each of 11 items (e.g., "Say mean things to someone or call someone names"), participants rated how often in the past month they had performed (for perpetration) or experienced (for victimization) each behavior on digital media on a 5-point Likert-type scale with ratings from 1 (*never*) to 5 (*every day*). The item "Post embarrassing videos or pictures of others online" was omitted because participants remarked that they perform this behavior for fun on Facebook for a friend's birthday. Mean scores were computed using the remaining ten items (each) on CBP and CBV (CBP: $M_{W1} = 1.22$, $M_{W2} = 1.22$, $M_{W3} = 1.26$; CBV: $M_{W1} = 1.22$, $M_{W2} = 1.21$, $M_{W3} = 1.25$). Cronbach's alphas at wave 1, 2, and 3 were .71, .76, and .79 for CBP and .78, .80, and .82 for CBV.

ONLINE PROSOCIAL BEHAVIOR

The Online Prosocial Behavior Scale (see Chapter 1) was used as a measure of receiving and performing online prosocial behavior. This scale was specifically developed to measure adolescents' online prosocial peer interactions, and it has been shown to be a valid and reliable instrument (see Chapter 1). Many items of the measures of online antisocial and prosocial behavior mirror each other (e.g. "say nice things to someone" vs. "say mean things to someone", "exclude someone from a group conversation" vs. "include someone in a group conversation"), illustrating the link between these concepts. For each of 10 items

(e.g., “Cheer someone up”, “Offer help to someone”), participants rated how often in the past month they had performed (POPB) or been recipient (ROPB) of each behavior using digital media on a 5-point Likert-type scale with ratings from 1 (*never*) to 5 (*every day*). Mean scores were computed for each subscale (POPB: $M_{W1} = 3.33$, $M_{W2} = 3.31$, $M_{W3} = 3.32$; ROPB: $M_{W1} = 2.99$, $M_{W2} = 2.99$, $M_{W3} = 3.00$). Cronbach's alphas at all waves were .90-.91, for both subscales.

STATISTICAL ANALYSIS

Structural equation modeling (SEM) was applied to analyze the associations between cyberbullying perpetration and victimization, and between performing and receiving online prosocial behavior, using Mplus 7.4 (Muthén & Muthén, 2015). Two RI-CLPMs (Hamaker et al., 2015) were modelled to examine the directional effects in cyberbullying and online prosocial behavior, following the approach outlined by Hamaker et al. (2015). First, in each model one random intercept was created for CBP, CBV, POPB, and ROPB each, by regressing their observed composite (mean) scores of the three waves on one latent factor and constraining the factor loadings to one. These random intercepts reflect the invariant, trait-like interpersonal differences in the variables, and in this way, the between-person variability can be separated from the within-person variability. Second, latent variables of the observed scores were created by regressing these scores on latent factors whilst constraining the factor loadings to one and constraining the variances of the observed variables to zero. These latent factors take into account the within- and between-person variability. The covariances between the random intercepts and the latent variables of the observed scores were constrained to zero, as well as the means of the observed variables. Because the intervals between the waves were equally spaced, the lagged parameters were constrained to be equal across waves.³ To take the non-normality of the data into account, maximum likelihood estimation with robust standard errors (MLR) was used. Full information maximum likelihood (FIML) estimation with robust standard errors was applied to handle missing data.

RESULTS

First, the intra-class correlation coefficients for each construct were calculated in SPSS 23 to examine the proportion of the variance accounted for by between- and within-individual differences. These were .526 for POAB, .486 for ROAB, and .611 for both POPB and ROPB, meaning that 49 to 61% of the variance in these variables over time was due to inter-individual differences, whereas 39 to 51% of the variance was due to variability (or fluctuations) within individuals. Traditional CLPM-models do not take into account these stable inter-individual differences, therefore we applied RI-CLPM in which the random intercepts account for the stable inter-individual variability (see Figure 1 for the model for cyberbullying; an equivalent model was used for online prosocial behavior).

CYBERBULLYING

The RI-CLPM showed an excellent fit for the associations between cyberbullying perpetration and victimization, $\chi^2(9) = 15.131$ ($p = .088$), RMSEA = .018 (90% CI = [.000, .033]), CFI = 0.994, TLI = 0.989, and SRMR = 0.026. The parameter estimates (see Table 1) indicate that stable between-person differences in cyberperpetration are positively associated with stable between-person differences in cybervictimization. This means that, across waves, adolescents who reported to be more often than average engaged in cyberbullying perpetration, also reported to be victims of cyberbullying more often. Furthermore, the significant wave 1-covariation and wave 2 and 3-residual covariations indicate that within-person change (or deviation from an individual's expected score) in cyberbullying perpetration and within-person change (or deviation from an individual's expected score) in cyberbullying victimization are also associated. Hence, adolescents who reported increasing cyberbullying perpetration at a particular point in time, also reported more cyberbullying victimization at that time point. This association is not linked to changes in cyberbullying involvement six months earlier, but is attributable to an (unknown) time-varying process. Most strikingly, by explicitly modeling the inter-individual differences in cyberbullying, no significant autoregressive or cross-lagged paths emerge. This means that over time there are no within-person influences of adolescents' cyberbullying perpetration on their later perpetration or victimization and vice versa.

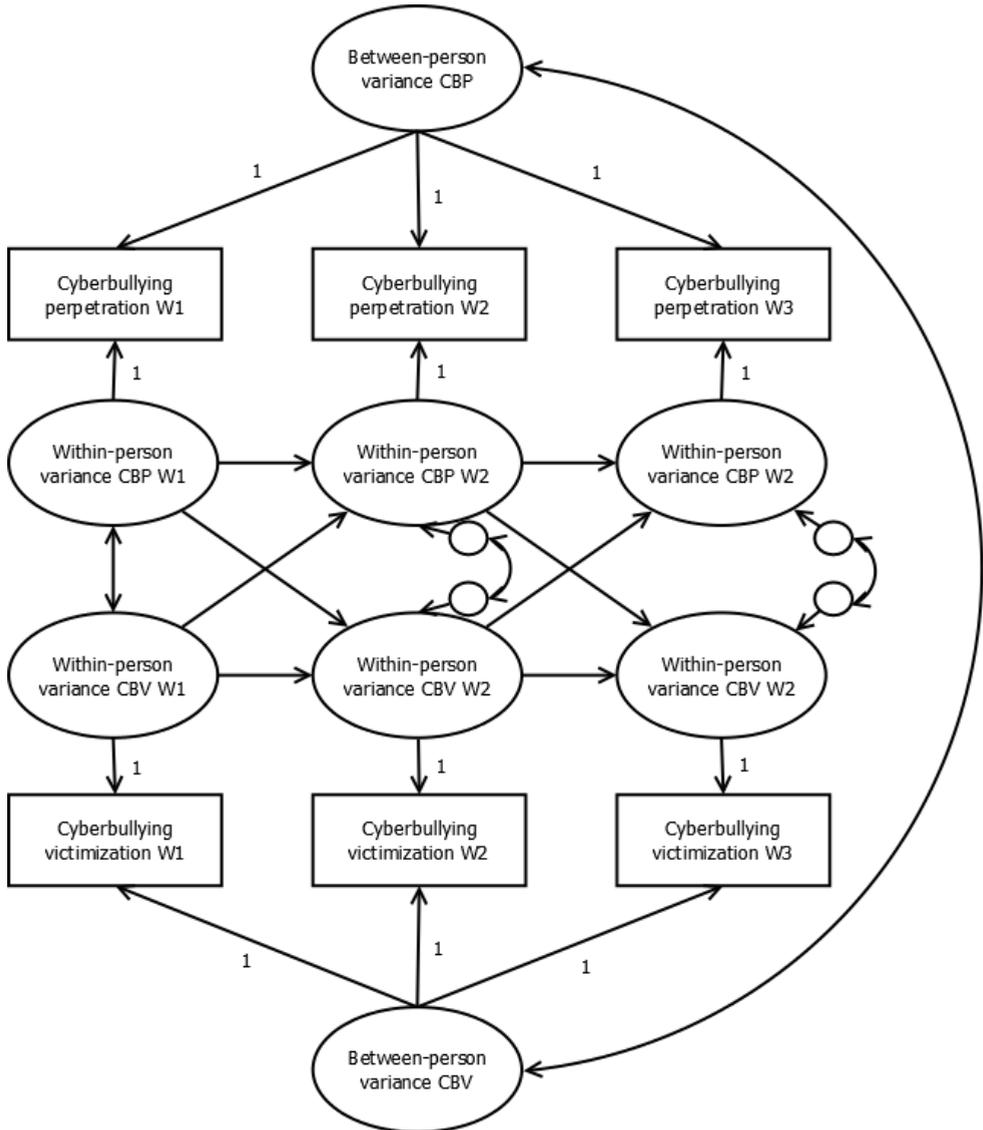


Figure 1. Random intercept cross-lagged panel model (RI-CLPM) for the association between cyberbullying perpetration and cyberbullying victimization across three waves. The two random intercepts (“between-person variance CBP” and “between-person variance CBV”) represent stable inter-individual differences. The autoregressive and cross-lagged paths between the latent factors, the correlation between the latent factors at wave 1, and the correlated residuals at wave 2 and 3 represent within-person processes.

Table 1

Unstandardized (B) and Standardized (β) Parameter Estimates of the RI-CLPM for the Longitudinal Associations Between Cyberbullying Perpetration and Victimization, and Between Performing and Receiving of Online Prosocial Behavior, Across Three Waves

	<i>B</i>	<i>SE(B)</i>	β	<i>SE(β)</i>	$\rho(\beta)$
Cyberbullying					
Perpetration W1 → Perpetration W2	0.118	0.110	0.108	0.098	.270
Perpetration W2 → Perpetration W3	0.118	0.110	0.090	0.088	.306
Victimization W1 → Victimization W2	0.125	0.090	0.128	0.092	.163
Victimization W2 → Victimization W3	0.125	0.090	0.103	0.077	.182
Perpetration W1 → Victimization W2	0.105	0.095	0.086	0.078	.274
Perpetration W2 → Victimization W3	0.105	0.095	0.077	0.074	.296
Victimization W1 → Perpetration W2	0.056	0.065	0.065	0.073	.371
Victimization W2 → Perpetration W3	0.056	0.065	0.049	0.058	.400
Covariation W1	0.012	0.005	0.229	0.076	.003
Residual covariation W2	0.024	0.008	0.434	0.084	.000
Residual covariation W3	0.046	0.007	0.510	0.049	.000
Between-person covariation	0.045	0.007	0.758	0.051	.000
Online prosocial behavior					
Performing W1 → Performing W2	0.143	0.071	0.150	0.072	.038
Performing W2 → Performing W3	0.143	0.071	0.152	0.076	.047
Receiving W1 → Receiving W2	0.124	0.061	0.137	0.066	.038
Receiving W2 → Receiving W3	0.124	0.061	0.133	0.067	.046
Performing W1 → Receiving W2	0.129	0.069	0.126	0.068	.065
Performing W2 → Receiving W3	0.129	0.069	0.129	0.072	.072
Receiving W1 → Performing W2	0.116	0.048	0.137	0.056	.015
Receiving W2 → Performing W3	0.116	0.048	0.132	0.057	.020
Covariation W1	0.273	0.025	0.726	0.024	.000
Residual covariation W2	0.222	0.023	0.732	0.027	.000
Residual covariation W3	0.180	0.017	0.672	0.027	.000
Between-person covariation	0.310	0.027	0.894	0.015	.000

ONLINE PROSOCIAL BEHAVIOR

The RI-CLPM for online prosocial behavior also showed an excellent fit, $\chi^2(9) = 2.821$ ($p = .971$), RMSEA = .000 (90% CI = [.000, .000]), CFI = 1.000, TLI = 1.002, and SRMR = 0.006. The parameter estimates (see Table 1) indicate that performing and receiving online prosocial behavior are significantly correlated, both at the stable, between-person level, as at the time-varying within-person level. In other words, adolescents who reported to behave more prosocially than average online, also reported to be recipients of prosocial behavior performed by others more often. Furthermore, the autoregressive paths of POPB and ROPB

are significant, indicating that within-person deviations from expected scores on POPB predict later deviations from expected scores on POPB, and likewise for ROPB. In other words, within persons, an increase in performing (or receiving) online prosocial behavior leads to even more performing (or receiving) of prosocial behavior later on. Finally, the cross-lagged paths from ROPB to POPB are significant, reflecting that deviations from adolescents' own expected score on ROPB are predicted by deviations from their own expected score on POPB six months earlier. Stated differently, receiving more online prosocial behavior leads to increases in prosocial acting online later on.

DISCUSSION

This study aimed to provide insight into the within- and between-person processes behind the associations between the performing and receiving of online antisocial and prosocial behavior. Applying random intercept cross-lagged panel models in a sample of 2,168 adolescents, the longitudinal associations between perpetration and victimization of cyberbullying on the one hand, and performing and receiving online prosocial behavior on the other hand, were tested across three waves of data collection spaced six months apart. The results suggest that cyberbullying victimization and perpetration are positively associated at the stable between-person level and covary in the same direction over time, but within individuals, involvement in cyberbullying at one time point does not predict later cyberbullying victimization or perpetration. Stated differently, we did not find evidence for a long-term pattern in which individuals who are cyberbullied later cyberbully others and vice versa. Thus, the current findings do not indicate the presence of long-term negative spirals of online antisocial behavior, specifically cyberbullying. Our findings do not support an over-time escalating cycle of cyberbullying others and being cyberbullied oneself.

Our findings on the absence of bidirectional relationships between cybervictimization and cyberperpetration contrast with predictions from the General Aggression Model (Anderson & Bushman, 2002) and with some of the previous findings on the longitudinal associations in cyberbullying (Barlett & Gentile, 2012; Espelage et al., 2013; Pabian & Vandebosch, 2015; van den Eijnden et al., 2014). However, this study is the first to use RI-CLPM, a method that allows to disentangle between- from within-person effects in the link between

cybervictimization and cyberperpetration. Our results do confirm the previously reported association between cybervictimization and cyberperpetration when examined at a between-person level of analysis: adolescents who are more frequently victimized online also cyberbully others more often. Additionally, within-person deviations in cyberbullying victimization are also linked to within-person deviations in cyberbullying perpetration (the variables covary across time). Thus, cyberbullying perpetration and victimization rates vary synchronously both between and within individuals.

Between-person differences in variables which have been identified as risk factors for cyberbullying, such as family or personal characteristics (Ang, 2015; Guo, 2016; Kowalski et al., 2014), may play a role in this association, especially because research has shown that there is a significant overlap in the antecedents of cyberbullying victimization and perpetration (Kowalski et al., 2014). The findings are also consistent with those of previous studies using person-centered clustering techniques (latent class or transition analysis) to examine involvement in cyberbullying, which have shown that for most adolescents cyberbullying involvement most often entails co-occurring victimization and perpetration, and not exclusive victimization or perpetration (Festl, Vogelgesang, Scharnow, & Quandt, 2017; Schultze-Krumbholz et al., 2015). Furthermore, factor analyses of cyberbullying instruments have shown that many items measuring cyberbullying perpetration and victimization load on one single “cyberbullying victimization/perpetration” factor (Law, Shapka, Hymel, Olson, & Waterhouse, 2012; Menesini, Nocentini, & Calussi, 2011). In sum, our findings confirm the link between cyberbullying victimization and perpetration, but do not provide support for a long-term dynamic process in which being cyberbullied leads to cyberbullying others six months later and vice versa.

In contrast, the association between being the beneficiary of online prosocial behavior and behaving prosocially online does reflect within-person reinforcements of this behavior over time. In other words, the findings reveal positive spirals of online prosocial behavior within adolescents, such that (1) those who behave more prosocially online will increase this behavior over time, and (2) those who benefit more from others’ online prosocial behavior towards them will increasingly benefit over time, and (3) will increasingly act prosocially towards others themselves. (The findings also provide some indications that more often

performing online prosocial behavior leads to later increases in receiving this behavior, but these results are only significant at $p < .10$.) These findings are consistent with the theory of bounded generalized reciprocity (Yamagishi et al., 1999) in online contexts, which posits that when people observe others behaving prosocially, this creates an expectation of reciprocal prosocial behavior and motivates them to behave prosocially themselves.

It might be that cycles of negative behavior online occur more rapidly than cycles of positive behavior. Perhaps the sequences of cyberbullying victimization and perpetration happen on a short term or almost simultaneously, e.g., immediately bullying back after having been bullied, whereas the sequences of prosocial exchanges take more time or last longer. Nevertheless, the results of our study suggest that being the recipient of online prosocial behavior has long-lasting increasing effects on acting prosocially online, whereas this is not evident for online antisocial behavior.

Another possible explanation for the existence of a positive spiral but the lack of a negative spiral may be found in the emotions linked to these behaviors. When individuals are the beneficiary of others' prosocial behavior, they are likely to experience positive emotions, such as gratitude and happiness, and these may stimulate them to act prosocially towards others themselves (Bartlett & DeSteno, 2006). In contrast, when people are the target of others' negative actions, this may elicit negative emotions which prepare approach (e.g., anger stimulates revenge) or avoidance (e.g., fear and sadness stimulate withdrawal) action tendencies (Frijda, 1986), i.e., stimulate or inhibit reactions against the other. However, due to the possibility for anonymity online it may not always be clear who the perpetrator is, hence reacting against the perpetrator is not always possible. Furthermore, victims may be less technologically skilled (Vandebosch & Van Cleemput, 2008) or the costs of retaliation may outweigh the benefits (cf., social exchange theory, Emerson, 1976), making retaliation less likely. An alternative explanation may be derived from the reinforcing spirals model (Slater, 2007), which posits that media use influences individuals' cognitions and behavior, which shapes their subsequent media use. On the one hand, when adolescents are exposed to online peer social support and recognition, this may motivate them to interact more frequently with those peers and imitate their behavior, resulting in a positive reinforcing cycle of prosocial interactions. In contrast, when adolescents are exposed to antisocial

online behavior, they often turn to others for help to stop the harassment or avoid further contact with the offender, e.g., by unfriending or blocking (Šléglová & Černá, 2011; Weinstein et al., 2016). Consequently, the exposure to that behavior may decrease, and reinforcing spirals do not develop.

As our study sample was limited to young adolescents, caution should be applied when generalizing these results to other populations. Further, the data were solely based on participants' self-reports. These may have been subject to social desirability bias, leading to underreporting of cyberbullying involvement or overreporting of prosocial behavior. Future studies could benefit from including other-reports to obtain a view of how others perceive the participants' behavior. Notwithstanding these limitations, the findings of this study provide a better understanding of the processes at play in adolescents' online antisocial and prosocial interactions. Our results suggest a long-term mutual reinforcement of being the recipient and actor of online prosocial behavior, whereas no evidence was found for a within-person longitudinal bidirectional relationship between being a cyberbully and being a cybervictim. In conclusion, this study shows that online prosocial behavior engenders long-term positive spirals of prosocial exchanges, but cyberbullying does not result in long-term negative spirals of antisocial interactions.

NOTES

¹ Although cyberbullying is a type of online antisocial behavior, it can be studied on the same level as online prosocial behavior. Cyberbullying as a concept also encompasses several types of behavior (Pieschl et al., 2013). Furthermore, research with 9- to 13-year-old children has shown that, when asked to describe antisocial incidents, they describe four categories of antisocial behavior: physical abuse, verbal abuse, rejection and delinquency (Warden et al., 1996; Warden and Christie, 1997). These categories correspond to behavior categories typically identified in (traditional) bullying research (Whitney and Smith, 1993).

² The term *reciprocity* is also sometimes used in the context of negative or antisocial behavior, referring to the norms and beliefs that people have towards retribution and revenge as a valid response against unfavorable treatment. Here, we use the term reciprocity to refer to positive reciprocity only.

³ We also tested the models without constraints on the lagged parameters, but these did not have a better fit than the constrained models. Cyberbullying: $\chi^2(5) = 19.152$ ($p = .971$), RMSEA = .036 (90% CI = [.020, .054]), CFI = 0.985, TLI = 0.956, and SRMR = 0.022; online prosocial behavior: $\chi^2(5) = 2.953$ ($p = .707$), RMSEA = .000 (90% CI = [.000, .022]), CFI = 1.000, TLI = 1.001, and SRMR = 0.004.

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CHAPTER 3

THE LONGITUDINAL ASSOCIATION BETWEEN POOR SLEEP QUALITY AND CYBERBULLYING, MEDIATED BY ANGER

This chapter is based on the following publication:

Erreygers, S., Vandebosch, H., Vranjes, I., Baillien, E., & De Witte, H. (2018). The longitudinal association between poor sleep quality and cyberbullying, mediated by anger. *Health Communication*. doi:10.1080/10410236.2017.1422098

THE LONGITUDINAL ASSOCIATION BETWEEN POOR SLEEP QUALITY AND CYBERBULLYING, MEDIATED BY ANGER

Abstract

Adolescents tend to go to bed later and sleep less as they grow older, although their need for sleep stays the same throughout adolescence. Poor sleep has negative consequences on personal and interpersonal functioning, including increased aggressive tendencies. With adolescents' social life increasingly including interactions via digital media, these interactions may also become more aggressive when adolescents' sleep problems increase. One of the ways in which online aggression may be enacted, is through cyberbullying. Although previous research has examined the role of sleep disruptions in offline bullying, the role of sleep in cyberbullying has not yet been addressed. Therefore, this study examines the longitudinal effect of poor sleep quality on later cyberbullying behavior. 13 to 14-year-old adolescents completed self-report measures on sleep quality, anger, cyberbullying perpetration, and frequency of digital media use. Because one of the pathways through which sleep is proposed to be linked to aggression is an affective pathway, namely via angry affect, a mediation model of poor sleep quality predicting cyberbullying via feelings of anger was tested. Results from structural equations modeling and a bootstrap test indicated that poor sleep quality was indeed indirectly associated with later cyberbullying behavior through heightened feelings of anger, even when taking the effects of use of digital media and previous cyberbullying behavior into account. This finding provides support for the proposed affective pathway linking sleep problems to aggression. As sleep problems and anger seem to play a predicting role in cyberbullying behavior, suggestions for cyberbullying intervention and prevention strategies are formulated.

INTRODUCTION

The negative consequences of poor sleep on personal and interpersonal functioning have extensively been documented in adults as well as in children and adolescents (Harvey, Murray, Chandler, & Soehner, 2011; Roth & Roehrs, 2003; Shochat, Cohen-Zion, & Tzischinsky, 2014). One of the interpersonal functioning domains affected by sleep disruptions is aggression: cross-disciplinary research has shown a clear link between sleep problems and aggression (Kamphuis, Meerlo, Koolhaas, & Lancel, 2012; Krizan & Herlache, 2016).

In a review integrating cross-disciplinary evidence of the effects of sleep disturbance on aggression, Krizan and Herlache (2016) suggest that sleep problems may play an important role in the domain of offline bullying and cyberbullying (i.e., intentional negative behavior that occurs through the use of electronic technologies; Smith et al., 2008). Insufficient sleep predicts decreased neurobehavioral functioning, impeding crucial behavioral and mental functions needed for adequate social interaction (Gregory & Sadeh, 2012; Krizan & Herlache, 2016). Over time sleep disruptions may thus contribute to aggressive behavior and bullying among students, which can be evident at school and online (Krizan & Herlache, 2016). In this domain, sleep-targeted interventions at the individual and/or institutional level may be promising avenues for intervention and prevention of children and adolescents' antisocial interpersonal behavior.

Previous studies have indicated that sleeping problems in children and adolescents are related to offline bullying and aggression. For instance, in a study with 49 healthy 7- to 12-year old children, objectively measured (with belt-worn activity monitors) low sleep time was associated with teacher-reported externalizing symptoms such as aggressive and delinquent behavior (Aronen, Paavonen, Fjällberg, Soininen, & Törrönen, 2000). Further, a survey study among parents of 2- to 14-year old children visiting two general clinics showed that parent-rated bullying and other aggressive behaviors were associated with symptoms of sleep disorders (sleep-disordered breathing, restless legs syndrome, or periodic leg movements during sleep; Chervin, Dillon, Archbold, & Ruzicka, 2003). Findings from a study among 5,420 Scottish secondary school pupils indicated that victims, bullies, and bully-victims were more likely to experience sleep difficulties when compared to uninvolved

pupils (Hunter, Durkin, Boyle, Booth, & Rasmussen, 2014). However, to date no studies have examined the role of sleep in cyberbullying among adolescents, which might be especially relevant, because (1) adolescents intensively use digital platforms to communicate with their peers (Lenhart, Smith, Anderson, Duggan, & Perrin, 2015), (2) high use of digital media negatively affects adolescents' sleep (Cain & Gradisar, 2010), and (3) sleep loss impedes social interactions with peers (Sarchiapone et al., 2014). Therefore, the aim of this study is to investigate the potential relevance of sleep in explaining cyberbullying perpetration behavior, and the possible mediating path via anger.

ADOLESCENT SLEEP AND CYBERBULLYING CHARACTERISTICS

Sleep as well as cyberbullying are particularly relevant during adolescence. As adolescents grow older, they go to bed increasingly later (Crowley, Acebo, & Carskadon, 2007). However, their schools require them to rise early and this combined with their delayed bedtime diminishes their sleep time, especially during weekdays. Yet, the hours of sleep that adolescents need is the same from age 10 to 17. Poor sleep quality and quantity are therefore common in adolescence (Moran & Everhart, 2012).

Adolescence is also a pertinent life phase regarding cyberbullying. Cyberbullying occurs from childhood to adulthood, but it shows a clear peak during early adolescence (for a meta-analytical review, see Kowalski, Giumetti, Schroeder, & Lattanner, 2014). Cyberbullying is related to a host of negative short- and long-term consequences (Zych, Ortega-Ruiz, & Del Rey, 2015), therefore it is highly important to gain more insight into its antecedents to advance the development of effective prevention strategies.

Both sleep and cyberbullying are related to the use of digital media. Youngsters are particularly avid users of digital media: in 2014 the highest daily use of the internet in EU-countries was among 16-19 year olds (Eurostat, 2015). As cyberbullying is intentional negative behavior that occurs through the use of electronic technologies (Smith et al., 2008), this behavior can only occur if people use digital media. Moreover, research suggests that a higher use of digital media is associated with increased cyberbullying (e.g., Walrave & Heirman, 2011).

Digital media use also has an adverse effect on sleep: more frequent use of digital media leads to later bed times, less sleep hours, and more tiredness (for a review, see Cain & Gradisar, 2010). For instance, in a study with 2,546 adolescents, television viewing, computer game playing, and internet use were all related to sleep disturbances (Van den Bulck, 2004).

SLEEP AND AGGRESSION

Research findings from several disciplines corroborate the clinical observation that sleep problems can fuel aggressive behavior (for reviews, see Kamphuis et al., 2012; Krizan & Herlache, 2016). This link between sleep loss and amplified aggressive reactions is likely mediated by the detrimental effect of sleep disruptions on neurobiological systems such as prefrontal cortical functioning, serotonin, and the hypothalamic-pituitary-adrenal-axis (Kamphuis et al., 2012). The impairment of these systems may contribute to the loss of affective, cognitive, and response-control functions related to aggressive responses (Krizan & Herlache, 2016), in accordance with the General Aggression Model (GAM; Anderson & Bushman, 2002). The GAM provides an overarching, comprehensive social-cognitive framework of aggression. It proposes three main stages in situations of aggression: person and situation inputs, routes (internal states, namely cognitive, physiological, and affective pathways), and outcomes of appraisal and decision processes (Anderson & Bushman, 2002). In this study, the focus is on the affective pathway linking sleep problems to aggression, in particular cyberbullying.

Bullying is a particular form of aggression with three specific characteristics: repeated behavior, intention to harm, and power imbalance (Olweus, 1996). Especially in the online context, it can be difficult to tease bullying and aggression apart, as not all criteria to distinguish offline bullying from aggression may be necessary to define cyberbullying (in particular repetition and power imbalance; Thomas, Connor, & Scott, 2015). Models and theories from the aggression literature (e.g., the GAM) are often applied to (cyber)bullying (Kowalski et al., 2014), and aggressive motivations seem to underlie cyberbullying acts (Law, Shapka, Domene, & Gagné, 2012). Therefore, both research on the role of sleep in aggression and in bullying are relevant when examining the role of sleep in cyberbullying.

THE ROLE OF ANGER

One way through which sleep problems may lead to aggressive responses is via an affective pathway, specifically through anger (Kamphuis & Lancel, 2015; Krizan & Herlache, 2016). Anger is a strong negative emotion felt in response to a perceived wrongdoing (Averill, 1983). People experience anger in situations that they appraise as unfair and unpleasant and in which one's goals are obstructed (Scherer, 1997). Here, the terms 'anger', 'angry affect' and 'angriness' are used interchangeably to refer to the subjective experience of feeling angry, encompassing more long-lasting and diffuse moods as well as more specific, situation-bound emotions (Gross & Thompson, 2007). Multiple – mostly correlational and self-report – studies have shown that sleep disruptions (in terms of decreased sleep duration or diminished sleep quality) are associated with increased anger and hostility (e.g., Lund, Reider, Whiting, & Prichard, 2010; Shin et al., 2005).

The path from anger to aggression has also received much research attention. Anderson and Bushman (2002) argue that anger elicits aggressive tendencies and these tendencies are not only directed towards the anger instigator, but also often to non-related individuals (i.e., displaced aggression; Fenigstein & Buss, 1974). This is especially relevant in cyberbullying, as the internet provides an unlimited number of possible targets to aggress against. Moreover, anger that cannot be expressed offline (for example, because of fear of being hurt physically or because of a power difference), can often be acted out more easily online, where individuals can remain anonymous, harass others 24/7, and escape (adult) supervision (cf., the online disinhibition effect; Suler, 2004). Several studies have provided support for an association between anger and cyberbullying (Ak, Özdemir, & Kuzucu, 2015; den Hamer, Konijn, & Keijer, 2014; Lonigro et al., 2015).

THIS STUDY

Taken together, the reviewed research suggests that sleep disturbances may lead to cyberbullying through increased feelings of anger. This process is particularly relevant in adolescence, when individuals are especially prone to sleep problems and cyberbullying involvement, combined with and reinforced by high use of digital media. Therefore, this study examines whether sleep problems predict later cyberbullying behavior through anger among adolescents. Although sleep has many dimensions, such as sleep quality,

sleep duration, and drowsiness, which may all affect aggression, the current study focuses on one aspect of sleep, namely the effect of poor sleep quality, on adolescents' cyberbullying behavior. Using longitudinal data from a large sample of Belgian adolescents, the study tests a mediation model of sleep quality and cyberbullying perpetration via anger, taking into account adolescents' previous involvement in cyberbullying. Frequency of digital media use was also controlled for at both time points. This variable correlates with both the independent (sleep quality) and dependent (cyberbullying perpetration) variable. Therefore, it could be a confounder resulting in a possible spurious association between these two variables if not controlled for. The conceptual model is illustrated in Figure 1.

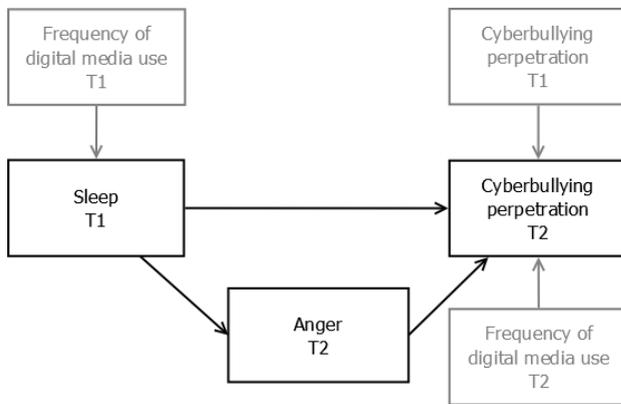


Figure 1. Conceptual model of the longitudinal association between sleep and cyberbullying with mediation via anger. Control variables are in gray.

METHOD

PROCEDURE

This study was part of a three-wave longitudinal research project. For this study, data from the second (T1: October–November 2015) and third wave (T2: March–May 2016) were used, because sleep quality was not measured in the first wave. The participants completed the survey on paper or electronically during school hours in the presence of the first author and/or thoroughly informed school staff. They were ensured that their answers would be treated confidentially and anonymously. To be able to link the participants' surveys across the waves, they were asked to provide the first letter of their own and their parents' first

name, their gender and their date of birth. The study received ethical approval from the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp, Belgium.

PARTICIPANTS

The participants were pupils from the second year of secondary education (equivalent to US grade 8). They were recruited via schools, which were randomly selected from the pool of all secondary schools in the province of Antwerp, Belgium. Of the 30 schools that were contacted, 13 schools agreed to participate; the other refused out of practical reasons, because they did not want to lose valuable class time to the administration of a survey, or because they were not able to comply with all research participation requests they had received. The participating schools were representative in terms of type of schooling offered (general education or vocational education). After the school principals provided active informed consent, all students from the second year were eligible for participation and their parents received a passive informed consent form. Thirteen pupils opted out of participation, resulting in a sample of 1,746 adolescents (45.1% boys) at T1, and 1,590 (44.3% boys) at T2. Two entire classes at T1 and eight classes at T2 did not participate due to practical issues during data collection. Participants were on average 13.55 years old ($SD = 0.55$) at T1 and 14.08 years old ($SD = 0.56$) at T2.

MEASURES

SLEEP QUALITY

The revised Adolescent Sleep-Wake Scale (Essner, Noel, Myrvik, & Palermo, 2015), a shortened version of the Adolescent Sleep-Wake Scale (ASWS; LeBourgeois, Giannotti, Cortesi, Wolfson, & Harsh, 2005) assessed participants' sleep quality. This 10-item scale comprises three subscales: Falling Asleep and Reinitiating Sleep (FARS), Returning to Wakefulness (RTW), and Going to Bed (GTB), measured on a 6-point Likert-type scale ranging from 1 (never) to 6 (always), with higher scores indicating better sleep quality. A second-order confirmatory factor analysis (CFA) was performed with the three subscales as first-order factors and Sleep Quality (SQ) as second-order factor, as the subscales were not the focus of this study. One item of the FARS-subscale ("When it's time to go to sleep, I have

trouble settling down” – reverse coded) was omitted because it had a low factor loading and modification indices indicated that it cross-loaded on the other subscales. The second-order CFA had an acceptable fit, RMSEA = .066 (90% CI [.058, .074]), CFI = .942, TLI = .916, SRMR = .046, and Cronbach’s alpha was .728.

ANGER

Adolescents were asked how often they felt angry in the past month. They rated their experience on a 7-point Likert-type scale ranging from 1 (*never*) to 7 (*[almost] all the time*).

CYBERBULLYING PERPETRATION

Adolescents’ perpetration of cyberbullying was assessed with the 11 items from the European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Del Rey et al., 2015; Schultze-Krumbholz et al., 2014). Participants had to rate how often in the past month they had performed each of the 11 behaviors via digital media (e.g., “Say mean things to someone or call someone names”) on a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*every day*). One item (“Post embarrassing videos or pictures of others online”) was excluded from the analysis because participants remarked that they do this for fun on Facebook for friends’ birthdays. As the rating scale had only five categories and the response distributions were skewed, weighted least squares with mean and variance adjustment (WLSMV) estimation was used in the analysis (Rhemtulla, Brosseau-Liard, & Savalei, 2012). A CFA with all items loading on one factor yielded an acceptable fit for time 1, RMSEA = .074 (90% CI [.067, .081]), CFI = .907, TLI = .881, and time 2, RMSEA = .084 (90% CI [.077, .091]), CFI = .942, TLI = .925. Cronbach’s alphas were .756 for time 1 and .788 for time 2.

FREQUENCY OF DIGITAL MEDIA USE

The items used in the Belgian version of the EU Kids Online questionnaire (EU Kids Online, 2014) assessed participants’ frequency of digital media use in the past six months. On a 6-point scale ranging from 1 (*never*) to 6 (*multiple times per day*), participants indicated how often they had performed each of 17 activities via digital media (e.g., “Visited a social network site”). Two items were deleted because they referred to activities that most participants did not understand (“Using a chatroom”, “Using data sharing websites”). For

the purpose of this study, only the aggregated effect of all the activities together was of interest (i.e., the quantity of use of digital media rather than the quality or different types); therefore, the items were treated as composite indicators and a composite variable of frequency of digital media use was constructed as the mean of the 15 remaining items. Cronbach's alpha for this scale was .796 at T1 and .795 at T2.

ANALYSIS

A mediation model was constructed using Mplus 7.4 (Muthén & Muthén, 2015). Cyberbullying perpetration at T2 was predicted by sleep quality at T1, with mediation via anger at T2. Anger at T2 was chosen because the effects of anger on aggression seem to happen on short term (however, we also tested a model with anger assessed at T1, cf., *infra*). To account for the effect of previous cyberbullying perpetration behavior, T1 cyberbullying perpetration was controlled for by predicting T2 cyberbullying perpetration. In so doing, the effect of sleep and anger on *change* in cyberbullying behavior from T1 to T2 is assessed. Also, as both cyberbullying and decreased sleep quality have been associated with use of digital media, this variable was controlled for as well through regressing T1 sleep quality on T1 frequency of digital media use and T2 cyberbullying perpetration on T2 frequency of digital media use.

Some of the variables were ordered categorical in nature, therefore the WLSMV-estimator was used (Rhemtulla et al., 2012). Missing data were MCAR and were handled using pairwise deletion, which is the default in Mplus, resulting in a sample size of 1,386 adolescents with complete data. The indirect effect was tested via a bootstrap analysis with 1,000 samples, generating a 95% confidence interval of the indirect effect, which indicates a significant effect when the interval does not include 0.

RESULTS

First, descriptive statistics of the study variables (all as composites) were calculated with SPSS (see Table 1). Then, structural equations modeling was performed with Mplus 7.4 (Muthén & Muthén, 2015) to test the proposed mediation model. Anger and frequency of digital media use were entered as manifest variables, whereas sleep quality (second order

factor) and cyberbullying perpetration were latent variables. In a preliminary analysis, a model without mediation by anger was constructed: T2 cyberbullying perpetration was predicted by T1 sleep quality directly, while controlling for T1 cyberbullying perpetration and frequency of digital media use. This model had an acceptable to good fit: RMSEA = .034 (90% CI [.032, .036]), CFI = .932, TLI = .926. The parameter estimates suggested a significant direct association between T1 sleep quality and T2 cyberbullying perpetration ($\beta = -0.112$, $p = .012$). The associations between T1 and T2 cyberbullying perpetration ($\beta = 0.580$, $p < .001$), T1 sleep quality and T1 frequency of digital media use ($\beta = -0.561$, $p < .001$), and T2 cyberbullying perpetration and T2 frequency of digital media use ($\beta = 0.108$, $p = .002$) were also significant.

Table 1
Means, Correlations and Standard Deviations (on the Diagonal)

Variable	1	2	3	4	5	6
1 SQ T1	0.811					
2 Anger T2	-.295	1.280				
3 CBP T1	-.232	.166	.317			
4 CBP T2	-.195	.229	.444	.368		
5 FDMU T1	-.226	.109	.361	.246	.779	
6 FDMU T2	-.174	.130	.237	.306	.642	.762
<i>M</i>	4.416	3.360	1.219	1.264	3.062	3.143

Note. SQ = sleep quality; CBP = cyberbullying perpetration; FDMU = frequency of digital media use. All correlations are significant at $p < .001$.

Next, a mediation model was constructed whereby T2 cyberbullying perpetration was predicted by T1 sleep quality, mediated via T2 anger (see Figure 2). T1 cyberbullying perpetration and frequency of digital media use were entered as control variables. This model also had an acceptable to good fit: RMSEA = .035 (90% CI [.033, .037]), CFI = .925, TLI = .918. There appeared to be a small but significant indirect effect of sleep quality on later cyberbullying perpetration via anger: $\beta = -0.061$, $p < .001$. Results of the bootstrap analysis confirmed this, as indicated by the 95% CI [-0.099, -0.029] which does not include zero. Together, these results suggested indirect-only mediation (Zhao, Lynch Jr., & Chen, 2010) of decreased sleep quality on cyberbullying perpetration via increased feelings of anger.

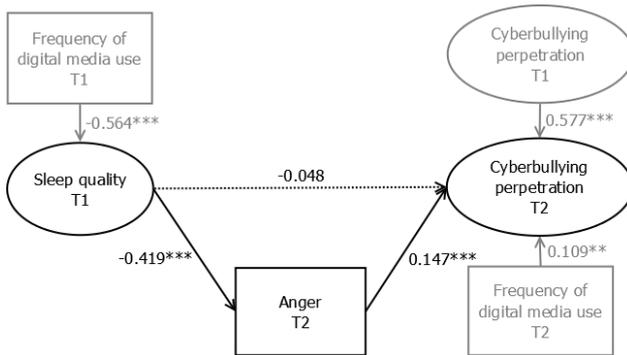


Figure 2. SEM model of the influence of sleep quality on later cyberbullying perpetration mediated via anger. Numbers indicate standardized parameter estimates. Control variables are in gray. ** $p < .01$, *** $p < .001$.

As a check of the robustness of our results, we also tested a model with anger at T1 as mediating variable. This model demonstrated a good fit as well, RMSEA = .035 (90% CI [.033, .037]), CFI = .923, TLI = .916, and the results of the parameter estimates were similar. A cross-sectional model with all variables measured at T2 (but still controlling for cyberbullying perpetration at T1) also had a comparable fit, RMSEA = .035 (90% CI [.033, .037]), CFI = .922, TLI = .915, and similar results for the parameter estimates.

DISCUSSION

Research increasingly suggests that sleep problems promote aggression (Kamphuis et al., 2012; Krizan & Herlache, 2016). One of the proposed paths through which disruptions in sleep may fuel aggressive tendencies is an affective path, namely through anger (Kamphuis & Lancel, 2015). This study aimed to test this process for one form of aggression that is especially relevant in adolescence: cyberbullying. As both poor sleep quality (Cain & Gradisar, 2010) and engagement in cyberbullying (Walrave & Heirman, 2011) are associated with the use of digital media, the influence of this variable was also taken into account. Using longitudinal data collected among 13-14 year old adolescents, a mediation model of sleep quality predicting later cyberbullying via anger was tested, with a bootstrap test of the indirect effect.

Our results indicate that, after accounting for previous cyberbullying perpetration and frequency of digital media use, poor sleep quality predicts later cyberbullying perpetration

indirectly via increased feelings of anger. This finding provides support for the proposed affective pathway of sleep problems to aggression via anger (Krizan & Herlache, 2016) and fits within the predictions of the GAM (Anderson & Bushman, 2002) about how personal variables, such as sleep problems, can lead to aggression via an affective path. Moreover, these findings are in accordance with previous studies that have reported associations between disrupted sleep and anger (e.g., Shin et al., 2005), and between anger and aggression or cyberbullying (e.g., Ak et al., 2015).

One of the strengths of this study is the use of longitudinal data, which allowed to analyze temporal processes and to control for previous engagement in cyberbullying in the prediction of cyberbullying perpetration by sleep problems. Moreover, use of digital media was also controlled for, as this variable is associated with both sleep disruptions (Cain & Gradisar, 2010) and cyberbullying (Walrave & Heirman, 2011).

Notwithstanding these strengths, some limitations need to be addressed. As not all the schools that were contacted agreed to participate, there may have been a selection bias in the study sample, such that those schools that were more concerned with their students' well-being may have been more likely to participate. Although this could influence the means of the variables, it seems unlikely that this would have an effect on the reported associations. Furthermore, although the study sample was large, the age range was narrow. Generalizations of these findings to considerably younger or older populations may not be warranted. It would be interesting to test whether the process found here (from sleep problems to cyberbullying perpetration via anger) also holds in other populations, or whether other or additional processes (such as mediation via the cognitive path) play a more important role. Another important limitation regards the measures used in this study. Anger in the past month was assessed with a one-item measure. The use of a multi-item measure of anger could be advised for future studies. Furthermore, the assessed time period of one month is rather long. Although we tried to facilitate recall by assessing adolescents' experienced events in the past months prior to assessing their emotions, it may still have been difficult to report their level of anger over the period of the past month. Also, the interval between the two measurement occasions was six months, which is a long time to assess the effect of emotions, as emotions are short-lived and immediate

reactions to changes in the environment. However, poor sleep quality is often chronic in adolescence and may develop (increase or decrease) over the course of a longer timeframe (Fredriksen, Rhodes, Reddy, & Way, 2004). This created issues for the design of the study regarding the optimal time point to assess each variable. In our model, we decided to assess anger and cyberbullying at the same time, but an equivalent model with anger assessed at the previous time point (i.e., together with the measurement of sleep quality) and a model with all variables assessed cross-sectionally at T2 (while still controlling for previous cyberbullying perpetration) yielded comparable results.

The findings of this study entail some important implications. As our results suggest that sleeping problems fuel cyberbullying perpetration behavior through heightened anger, several suggestions can be formulated for practitioners. Firstly, intervention and prevention strategies against cyberbullying could benefit from addressing adolescents' sleep patterns. Several measures can be taken to improve adolescents' sleep, at the individual as well as at the institutional level, such as promoting sleep hygiene (Moran & Everhart, 2012). Secondly, the regulation of anger could also be addressed. By teaching adolescents how to regulate their anger (and other emotions), they may feel less inclined to act out their anger towards other people online. Programs targeting emotion regulation in adolescents, such as the mindfulness-based program Learning to BREATHE (Metz et al., 2013), could be helpful in this regard, as could interventions that deter individuals to vent their frustrations online when they are angry. Perhaps angry individuals could also benefit from positive mood management strategies, such as watching funny cat videos, to temper their negative feelings (Myrick, 2015). Additionally, digital platforms could make use of reflective interfaces to automatically detect potentially harmful content and encourage users to reflect about what they intend to post before they actually post it (Dinakar, Jones, Havasi, Lieberman, & Picard, 2012).

In conclusion, the findings from this study suggest that sleep problems predict cyberbullying perpetration in adolescents through heightened feelings of anger, confirming the affective path to aggression as proposed by the General Aggression Model (Anderson & Bushman, 2002). This study is the first to examine the path from sleep problems to cyberbullying, and we think many other associations between cyberbullying and sleep need to be explored,

such as the association between sleep and cyberbullying victimization, possible mutual reinforcing effects of cyberbullying involvement and sleep problems, and many more. We hope this study can serve as an inspiration for more research on the relation between sleep and cyberbullying.

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CHAPTER 4

NICE OR NAUGHTY? THE ROLE OF EMOTIONS AND DIGITAL MEDIA USE IN EXPLAINING ADOLESCENTS' ONLINE PRO- AND ANTISOCIAL BEHAVIOR

This chapter is based on the following publication:

Erreygers, S., Vandebosch, H., Vranjes, I., Baillien, E., & De Witte, H. (2017). Nice or naughty? The role of emotions and digital media use in explaining adolescents' online prosocial and antisocial behavior. *Media Psychology, 20*(3), 374–400.
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NICE OR NAUGHTY? THE ROLE OF EMOTIONS AND DIGITAL MEDIA USE IN EXPLAINING ADOLESCENTS' ONLINE PRO- AND ANTISOCIAL BEHAVIOR

Abstract

The opportunities and mostly the risks of digital communication technologies for adolescents have been documented extensively in the last two decades, but less is known about how adolescents interact with each other online, especially regarding positive interactions. Moreover, since online prosocial and antisocial behavior have rarely been assessed simultaneously, it is hard to obtain a balanced view of adolescents' online behavior. Therefore, in this study, we examined both dimensions of online social behavior and how these are related to adolescents' experienced emotions and their uses of digital media. Findings indicated that participants performed and received more prosocial than antisocial behavior online. Experiencing negative as well as positive emotions was related to online social behavior, and these associations were mediated by adolescents' use of social and audiovisual media, but not by gaming or functional internet use. The social sharing of emotions and mood management theory are used to discuss the results.

INTRODUCTION

In the last decades, digital technologies have assumed increasing importance in the lives of adolescents, who have grown up as “digital natives”. Although some studies, such as EU Kids Online and Net Children Go Mobile (Livingstone & Haddon, 2009; Mascheroni & Ólafsson, 2014), have documented both the opportunities and the risks of the online world for children and adolescents, most research on digital communication technologies is devoted to the negative aspects of these technologies (de Leeuw & Buijzen, 2016). For instance, abundant research attention and media coverage has been allocated to adolescents’ experience with *content risks* (e.g., their exposure to pornography; Staksrud & Livingstone, 2009; Vandoninck, D’Haenens, & Donoso, 2010) and *contact risks* (e.g., the grooming activities directed at them; Whittle, Hamilton-Giachritsis, Beech, & Collings, 2013a, 2013b).

With regard to *conduct risks* (i.e., risks related to adolescents’ own online behavior, especially towards peers), cyberbullying appears to be one of the most studied topics. This behavior constitutes a particular form of antisocial behavior, characterized by an intentionality to hurt, repetitiveness, and an imbalance of power. Survey studies show that this behavior is quite common (Cappadocia, Craig, & Pepler, 2013; Kowalski, Giumetti, Schroeder, & Lattanner, 2014; Tsitsika et al., 2015), and has an important (negative) impact on adolescents’ well-being (Hamm et al., 2015). Studies that investigate positive online interactions amongst adolescents, and their (positive) outcomes are less numerous. Recently, de Leeuw and Buijzen (2016) have drawn attention to the dominance of research on negative over positive media effects in children and adolescents and have proposed to restore this balance by introducing positive psychology to the field of children and media. In this regard, Valkenburg and Peter (2007, 2008, 2009), for instance, have shown how communicating via digital media can enhance adolescents’ social competence, the closeness of their friendships, and social connectedness. Moreover, in their study with UK adolescents, Livingstone and Helsper (2010) have clearly shown that online opportunities and risks are strongly positively related and should be studied together.

Nevertheless, research that tries to map both antisocial and prosocial online behaviors simultaneously and looks at how these are related to negative and positive emotions resulting from adolescents' daily experiences (e.g., hassles and uplifts or more significant life events), is currently lacking. Yet research on offline social behavior already indicates that anti- and prosocial actions are often intertwined, and that (different) combinations may also result in (different) outcomes (i.e., lower or higher status within the peer group; Veenstra, 2006). Furthermore, theories and empirical studies focusing on explaining adolescents' (online) behavior clearly point to the importance of emotions (and emotion regulation).

The current study will therefore aim to shed light on adolescents' antisocial and prosocial online behaviors simultaneously. Moreover, we will attempt to uncover possible processes behind these behaviors by examining associations with the emotions adolescents experience (and with their use of digital technologies, as emotion-regulative behavior).

OFFLINE PRO- AND ANTISOCIAL BEHAVIOR IN ADOLESCENCE

DEFINITION AND DETERMINANTS

Research about offline social behavior can inspire the study of online social behavior. In the literature on offline social behavior, antisocial behavior is often defined as acting in a way that diminishes the well-being of other people or damages other people's property (Patterson, DeBaryshe, & Ramsey, 1990). Prosocial behavior can be defined as voluntary behavior that is carried out with the aim of benefitting others (Eisenberg, Fabes, & Spinrad, 2006). Prosocial behavior is not the same as altruism. Altruism is the opposite of egoism and entails the motivation to increase someone else's well-being instead of one's own (Batson & Powell, 2003). Prosocial behavior can be motivated by altruism and altruism can motivate prosocial behavior, but there is no necessary correspondence between the two (Batson & Powell, 2003). Research on the personality and family characteristics that influence the development of social behaviors have shown a large overlap in contributing factors, which affect prosocial and antisocial behavior in opposite directions, although there are also some differences in the determinants of these behaviors (for a review, see Veenstra, 2006). For example, hyperactivity, impulsivity, negative emotionality, sensation seeking, low intelligence, and ineffective parenting have been linked to antisocial behavior,

whereas cognitive skills, social intelligence, self-control, and parental warmth are associated with prosocial behavior (Veenstra, 2006).

ASSOCIATION BETWEEN ANTISOCIAL AND PROSOCIAL BEHAVIOR

The imbalance in the attention devoted to negative versus positive behaviors via digital technologies is also evident in research about offline antisocial and prosocial behavior (Bierhoff, 2002). Moreover, studies examining both antisocial and prosocial behavior at the same time are scarce and more research is needed to explore their dynamics in social development (Fabes, Carlo, Kupanoff, & Laible, 1999). In fact, although the predictors of both types of behavior show some overlap (albeit in opposite directions), antisocial and prosocial behavior are not necessarily two poles of one dimension. Veenstra (2006) summarized studies in which both behaviors were examined in the same sample. He concluded that anti- and prosocial behavior represent two dimensions, and that youngsters can show any combination of both behaviors (both prosocial and antisocial, neither prosocial nor antisocial, prosocial and not antisocial, antisocial and not prosocial, and all degrees in between).

IMPLICATIONS OF BEHAVING PROSOCIALY AND ANTISOCIALY

An individual's position on both social behavior dimensions has important implications for social status, well-being, and relationships with parents, peers, and teachers (Veenstra, 2006). Individuals combining a high level of antisociality with a low level of prosociality are often rejected by peers whereas individuals with the opposite combination are usually well-liked (sociometrical popularity). Nevertheless, youth who demonstrate antisocial as well as prosocial behavior tend to be perceived as popular by their peers (peer-perceived popularity). Thus, it is important to take both dimensions into account when studying adolescent social behavior.

ONLINE PROSOCIAL AND ANTISOCIAL BEHAVIOR IN ADOLESCENCE

As mentioned earlier, previous research has revealed several opportunities and risks of communication via digital media. And although there is plenty of research on negative behaviors in cyberspace, much less research has focused on prosocial online behavior, that

is on how adolescents can use digital technologies to increase *others'* – instead of, or next to their own – well-being. As there are excellent reviews on (forms of) online antisocial behavior (e.g., Kowalski et al., 2014; Modecki, Minchin, Harbaugh, Guerra, & Runions, 2014), we will not elaborate here on this behavior, but instead focus on online prosocial behavior.

To our knowledge, the first study on the topic of online prosocial behavior was conducted by Wang and Wang (2008), who examined why players help others in online games. The results of their online survey showed that altruism and reciprocity both influenced prosocial behavior among gamers. Next, Wright & Li (2011) investigated the relationship between online and offline prosocial behavior among young adults. Offline prosocial behavior was assessed with four prosocial behavior items from Prinstein and Cillessen's (2003) measure of aggressive and prosocial behaviors. Online prosocial behavior was assessed with four items adapted and created specifically for this study ("say nice things", "offer help", "cheer someone up", "let someone know I care about them"). The results of the survey revealed a positive association between engagement in offline and online prosocial behaviors, after controlling for gender and time spent using digital technologies. Furthermore, the more time adolescents spent using a specific digital technology, the more prosocial behaviors they displayed through that technology. The authors concluded that digital technologies also afford positive interactions and that more research on online prosocial behaviors is needed. The strong positive association between online and offline prosocial behavior was replicated in a survey among a large sample of Internet users in Bosnia and Herzegovina, Croatia and Serbia (Bosancianu, Powell, & Bratović, 2013). Prosocial online behavior was measured with a scale designed by the authors, which consisted of two factors assessing "institutionalized" (e.g., "How often do you contribute to Wikipedia or a similar site?") and "non-institutionalized" (e.g., "How often do you reply to an e-mail from someone you know who seeks help or information?") prosocial behavior. The authors interpreted the positive offline-online association as "limited evidence for the existence of a global 'pro-social' factor which can manifest itself in interpersonal interactions both online and offline" (2013, p. 59), although they nuanced their position by pointing out the considerable degree of unexplained variance in the association between online and offline prosocial behavior.

Finally, a study by Wright (2014) investigated online prosocial and antisocial (cyber aggression) behavior simultaneously. The author conducted a longitudinal study using peer nominations and self-reports to analyze the relationship of perceived popularity and social preference with online social behaviors among adolescents. Online antisocial behavior was assessed on two dimensions: cyber verbal aggression (CVA) and cyber relational aggression (CRA). Online prosocial behavior (OPB) was measured by the same items as in the previously mentioned study by this author. The correlations between peer-nominated and self-reported cyber aggression and online prosocial behavior were negative, except for four associations that were not significantly related (T2 self-rated CVA with T2 peer-nominated OPB, T1 self-rated CVA with T1 self-rated OPB, T2 self-rated CVA with T1 self-rated OPB, and T2 self-rated CVA with T2 self-rated OPB). Thus, this study provided evidence for a negative association between online antisocial and prosocial behavior, but more research is needed to confirm these preliminary findings. The results of the study further indicated that perceived popularity and social preference linearly predicted later online prosocial behavior, whereas later online antisocial behavior was linearly and curvilinearly predicted by both types of popularity.

In sum, the few studies examining online prosocial behaviors have indicated (a) associations of online prosocial behavior in gaming with altruism and reciprocity (Wang & Wang, 2008), (b) a strong positive correlation between online and offline prosocial behavior (Bosancianu et al., 2013; Wright & Li, 2011), and (c) the prediction of online prosocial behavior by perceived popularity and social preference (Wright, 2014). What remains unclear is whether and how online prosocial and antisocial behaviors are related, as only one study (Wright, 2014) has investigated both behaviors simultaneously and found mixed results for their correlations. Moreover, although some predictors and associated variables have been identified, online social behaviors are likely to be influenced by other variables that have not been researched yet. Investigating the processes involved in online prosocial and antisocial behavior can reveal important insights into why and how these behaviors are enacted and experienced, and how they can be inhibited or stimulated.

DETERMINANTS OF SOCIAL BEHAVIOR IN ADOLESCENCE

This study examines prosocial and antisocial behavior simultaneously. Moreover, the study aims to shed light on possible antecedents of online social behavior. Since there is an endless range of possible antecedents of this behavior, we decided to narrow our scope to the role of emotions, as emotions have already been shown to be antecedents of offline social behavior and of online antisocial behavior.

In research on offline social behavior, on the one hand it has been shown that negative emotionality, which means easily experiencing negative emotions such as anxiety, fear and anger, is related to delinquent behavior (Caspi et al., 1994), which is a form of antisocial behavior. On the other hand, studies have reported that depressive affect is negatively related to adolescents' offline prosocial behavior (Chen, Li, Li, & Li, Bo-shuLiu, 2000; Wentzel & Mcnamara, 1999).

In recent years, research attention has broadened from a focus on negative emotions and (offline) antisocial behavior, to a wider view that also includes positive emotions and (offline) prosocial behavior (Mikulincer & Shaver, 2010). These studies have revealed the important role of positive emotions, such as gratitude, forgiveness and empathy, in the development of and engagement in prosocial behavior (Bartlett & DeSteno, 2006; Eisenberg, 2015; Karremans, 2005).

With regard to online social behavior, abundant research has explored the determinants of online antisocial behavior, such as cyberbullying. Some of those studies have examined the link of this behavior with emotions, and it has been found for instance that anger in particular predicts perpetration and victimization of cyberbullying (Ak, Özdemir, & Kuzucu, 2015; Lonigro et al., 2015; Pabian & Vandebosch, 2015). Regarding online prosocial behavior, to the best of our knowledge, only the association of social status (popularity and peer-liking) with this behavior has been documented (Wright, 2014).

The findings from previous research about offline and online social behaviors and the influence of emotion were an inspiration for our study. Following the research on offline

social behavior, we decided to adopt a broad perspective and to assess the influence of a range of emotions, negative as well as positive.

THIS STUDY

In summary, there is a dearth of research on online prosocial behavior and of research examining prosocial and antisocial behavior simultaneously. Moreover, little is known about the variables associated with online prosocial behavior. This study aims to address these gaps in the literature by examining online prosocial and antisocial behavior together among adolescents. Furthermore, we aim to shed light on factors associated with these behaviors by investigating the relationships of online prosocial and antisocial behavior with experienced emotions. Using a self-report questionnaire in a large sample of adolescents, we set out to answer the following research questions:

RQ1. How are engagement (i.e., receiving and performing) in online prosocial and antisocial behaviors related?

RQ2. To what extent and how are emotions related to online prosocial and antisocial behaviors?

Our study is embedded in an ongoing longitudinal survey study on the online and offline experiences of adolescents. This paper reports on the findings specifically relating to online prosocial and antisocial behavior, using data from the first data collection.

METHOD

PARTICIPANTS

Participants were 1,720 Dutch-speaking adolescents (784 boys, 930 girls, six participants did not indicate their gender; $M_{\text{age}} = 13.61$, $SD_{\text{age}} = 0.49$) in the seventh grade of 13 schools in Belgium. 89.24% of the students were in the general education track, 10.67% in vocational education.

PROCEDURE

The data were collected during the first wave of data collection of an ongoing longitudinal study, in March of 2015 to May 2015. Participants were recruited through their schools. Schools were randomly selected from the province of Antwerp in Flanders. Thirty schools were contacted and 13 of them agreed to participate. Prior to administration, we obtained written permission from the school principals and passive informed consent from the students and their parents (as is customary in Belgium). All except 13 students agreed to participate. The study received ethical approval from the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp, Belgium.

The participants filled out pen-and-paper or (equivalent) electronic surveys in classrooms during school hours. In most schools, the author was present during the administration of the survey to answer questions. A few schools preferred to administer the questionnaire by their own personnel during spare hours. When the author was not present, teachers received detailed instructions on how to administer the survey and how to answer students' questions.

MEASURES

This study was part of a larger study on adolescents' online and offline experiences and included other measures which were not used in this analysis but are available upon request. After asking some demographic and biographic questions, we assessed online social behaviors and emotions.

ONLINE PROSOCIAL AND ANTISOCIAL BEHAVIOR

The scale to measure engagement in prosocial and antisocial behavior online consisted of two parts: The first part assessed which behaviors the adolescents had done themselves ("performing"), the second (equivalent) part assessed which behaviors the adolescents had received from others ("receiving").

The online antisocial behavior items were the items on cyberbullying and cybervictimization from the European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Schultze-Krumbholz et al., 2014). Although these items were originally intended to measure

cyberbullying and cybervictimization, Vandebosch and Van Cleemput (2009) have shown that not all potentially offensive practices via digital technologies are perceived as acts of cyberbullying by youngsters. Therefore, by not mentioning the word 'cyberbullying' nor providing a definition of the phenomenon, we obtained a measure of online antisocial behaviors, which encompass behaviors that may or may not be perceived as cyberbullying.

The online prosocial behavior items (see Chapter 1) consisted of five items adapted from the items used by Wright & Li (2011) ("say nice things", "offer help", "cheer someone up", "let someone know I care about them"). We split the first item into two: "say nice things *about* someone" and "say nice things *to* someone". Then we added nine more items based on two measures of offline prosocial behavior: Caprara and Pastorelli's Prosocial Behaviour Scale (1993) and Carlo and Randall's Prosocial Tendencies Measure (2002). In our sample, two items ("share information with someone" and "ask someone to join a group conversation") were poorly understood by many students, therefore we did not include them in the analysis. The final online prosocial behavior scale consisted of 12 items.

For both parts of the scale, we asked students about their engagement in the behaviors as victim/receiver and as perpetrator/sender in the past month: "How often have you experienced/performed the following behaviors via electronic media (mobile phone, computer, Internet...) in the past month?" Participants were asked to indicate their frequency of engagement in these behaviors on a 5-point scale ranging from 1 (*never*) to 5 (*every day*). Cronbach's alphas of the scales were .72 and .79 for performing and receiving online antisocial behavior, and .91 and .92 for performing and receiving online prosocial behavior, indicating moderate to excellent internal consistency.

EMOTIONS

A nine-item measure of emotions was created to assess emotions experienced in the past month. Six items measured negative emotions (angry, afraid, sad, ashamed, guilty, jealous) and three items measured positive emotions (happy, proud, loved) on a 7-point scale ranging from 1 (*never*) to 7 (*(almost) always*). Cronbach's alpha was .77 for the negative

emotions subscale and .68 for the positive emotions subscale, indicating low to moderate internal consistency.

ANALYSIS

Analyses were done in IBM SPSS 23 and Mplus 7.31 (Muthén & Muthén, 2015). We used structural equation modeling to test the association between emotions and online behavior. First, the measurement model was tested using confirmatory factor analysis. The behavior items were treated as categorical variables and therefore the weighted least square and variances adjusted (WLSMV) estimation method was used. We constructed four latent constructs for online digital behavior: receiving online prosocial behavior (ROPB), performing online prosocial behavior (POPB), receiving online antisocial behavior (ROAB), and performing online antisocial behavior (POAB). Two latent constructs were defined for emotions: negative emotions (NE) and positive emotions (PE). Maximum likelihood estimation was used to handle missing data. To determine how well the model fit the data, several goodness-of-fit indices were examined, including the χ^2 -test, the root mean square error of approximation (RMSEA), the Comparative Fit Index (CFI), and the Tucker-Lewis Index (TLI). The measurement model had an acceptable fit, except for the χ^2 (which is inflated due to large sample size): $\chi^2(1415) = 8075.004, p < .001$; CFI = 0.928; TLI = 0.924; RMSEA = 0.052 [0.051, 0.053]. Second, we tested the structural model for the regression of online behaviors on emotions.

RESULTS

DESCRIPTIVE ANALYSES

Descriptive analyses of the latent variables were run in SPSS by computing composite variables, which represent the mean scores across indicator items for each participant. Sample means and zero-order correlations of these composite variables are presented in Table 1.

Table 1
Zero-Order Correlations and Descriptive Statistics of Composite Variables

Variable	1	2	3	4	5	6
1 ROPB						
2 POPB	.806***					
3 ROAB	.205***	.268***				
4 POAB	.180***	.189***	.492***			
5 NE	.098***	.181***	.398***	.258***		
6 PE	.396***	.287***	-.099***	.007	-.258***	
<i>M</i>	2.863	3.223	1.214	1.220	2.422	4.959
<i>SD</i>	0.873	0.803	0.340	0.298	0.903	1.138
<i>Observed range</i>	1.000 – 5.000	1.000 – 3.900	1.000 – 3.910	1.000 – 3.900	1.000 – 6.500	1.000 – 7.000

Note. ROPB = receiving online prosocial behavior; POPB = performing online prosocial behavior; ROAB = receiving online antisocial behavior; POAB = performing online antisocial behavior; NE = negative emotions; PE = positive emotions.

* $p < .05$; ** $p < .01$; *** $p < .001$.

Comparing the means of the online behaviors, results showed that the participants reported more engagement in prosocial than in antisocial behavior, in terms of performing ($M_{\text{POPB}} = 3.223$; $SD_{\text{POPB}} = .803$; $M_{\text{POAB}} = 1.220$; $SD_{\text{POAB}} = .298$; $t(1717) = 103.468$; $p < .001$) as well as receiving ($M_{\text{ROPB}} = 2.863$; $SD_{\text{ROPB}} = .873$; $M_{\text{ROAB}} = 1.214$; $SD_{\text{ROAB}} = .340$; $t(1714) = 78.528$; $p < .001$). Participants also experienced more positive ($M_{\text{PE}} = 4.959$; $SD_{\text{PE}} = 1.138$) than negative emotions ($M_{\text{NE}} = 2.422$; $SD_{\text{NE}} = .903$; $t(1719) = 64.749$; $p < .001$).

Table 2 displays the five most frequently reported online prosocial and antisocial behaviors among our sample. The top 5 is largely similar across receiving and performing behaviors, with the most popular prosocial behavior being that adolescents let each other know that they like something the other did (e.g., liking on Facebook), and the most frequent antisocial behavior being that adolescents say mean things about each other.

Table 2
Most Frequent Online Prosocial and Antisocial Behaviors

	Behavior	<i>M</i>	Behavior	<i>M</i>
Receiving	Prosocial		Antisocial	
1.	Someone let me know that he/she liked something that I did	3.45	Someone said mean things about me to others	1.56
2.	Someone said nice things to me	3.20	Some said mean things to me or called me names	1.51
3.	Someone cheered me up	3.16	There were rumors spread about me	1.33
4.	Someone complimented or congratulated me	3.09	I was being excluded or ignored on a social network site or in a group conversation	1.23
5.	Someone let me know that he/she cares about me	3.01	Someone put my personal information online or passed on my personal information via messages	1.16
Performing	Prosocial		Antisocial	
1.	Let someone know that you like something he/she did	3.97	Say mean things about someone to others	1.58
2.	Compliment or congratulate someone	3.51	Say mean things to someone or call someone names	1.47
3.	Say nice things to someone	3.49	Exclude or ignore someone on a social network site or in a group conversation	1.41
4.	Cheer someone up	3.47	Spread rumors about others	1.26
5.	Support someone	3.36	Edit videos or photos which others had put online	1.19

STRUCTURAL MODEL OF EMOTIONS AND ONLINE SOCIAL BEHAVIORS

The result of the test of our structural model of emotions and social behaviors is presented in Figure 1. The coefficients of the parameter estimates are displayed in Table 3. All coefficients were positive, indicating that the more often students experienced emotions, the more they performed and received online prosocial and antisocial behaviors. The positive regression coefficients indicate positive associations of negative as well as positive emotions with receiving and performing both types of behavior. This is remarkable, because based on the research about offline social behaviors, we expected positive associations of positive (resp., negative) emotions with prosocial (resp., antisocial) behavior and negative

associations of positive (resp., negative) emotions with antisocial (resp., prosocial) behavior. Nevertheless, the values of the parameter estimates were considerably larger for the regressions of prosocial behaviors on positive emotions and antisocial behaviors on negative emotions than for antisocial behaviors on positive emotions and prosocial behaviors on negative emotions.

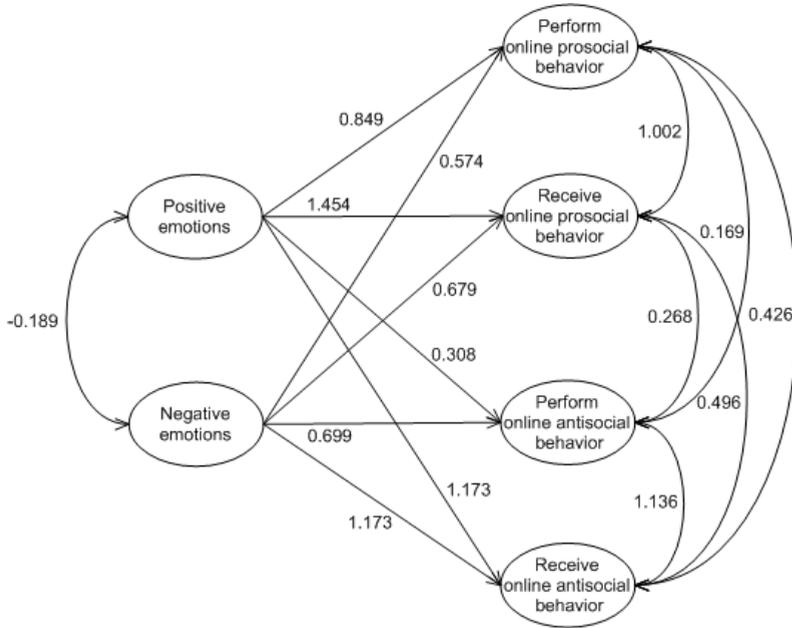


Figure 1. Structural model of emotions and online social behavior with parameter estimates. All coefficients are significant at $p < .001$, except for the regression of ROAB on negative emotions, which has a p -value of .033.

Table 3

Regression Estimates of the Structural Model

Parameter	Online antisocial behavior					Online prosocial behavior				
	Est	SE	z-score	p-value	R ²	Est	SE	z-score	p-value	R ²
Perform behavior					.140					.253
negative emotions	0.699	0.082	8.566	.000		0.574	0.052	11.068	.000	
positive emotions	0.308	0.085	3.620	.000		0.849	0.064	13.248	.000	
Receive behavior					.265					.318
negative emotions	1.173	0.107	10.940	.000		0.679	0.064	10.579	.000	
positive emotions	0.175	0.082	2.131	.033		1.454	0.098	14.907	.000	

POST-HOC ANALYSIS: MEDIATION BY MEDIA USE

The rather surprising finding that emotions of both valences were linked to both antisocial and prosocial behavior, elicited the question of why this could be the case. Why was the experience of positive emotions linked to involvement in prosocial as well as antisocial behaviors online, and why was the same true for negative emotions? We wondered whether there could be a mediating factor which could help explain these associations. The literature on mood management may be relevant in this regard. Mood management theory posits that media messages can influence people's mood, and that individuals often select particular media messages to regulate their mood (Zillmann, 1988). Although the theory has mainly been investigated in the context of television viewing, it has also been applied to other media, such as the internet (e.g., Leung, 2007). It has been found that depressive individuals turn to the internet to alleviate negative feelings and emotional distress (Gómez-Guadix, 2014). Furthermore, when adolescents experience stress, they use the internet to thwart anxiety and to substitute negative affect with positive affect (Leung, 2007). When stressed and in need of mood repair, adolescents seek comfort in the internet for entertainment but also for relationship maintenance and social recognition (Leung, 2007). In this way, negative moods can also have the capacity to trigger positive or prosocial online behavior, when they motivate adolescents to maintain their relationships online. However, not all uses of the internet are equally preferred to cope with negative emotions. In the same study by Leung (2007), it was found that adolescents rather used social media (ICQ) than online games to alleviate negative affect. This aligns with research by Zillmann (1988), who has shown that moods associated with high levels of arousal (such as negative moods caused by stress) are blocked best by non-arousing, calming media, whereas they are maintained by arousing, exciting media. Thus, could it be that the use of particular media may be an explaining factor in the association between emotions and online social behaviors?

In a post-hoc analysis, we investigated the mediating effect of use of digital media. Our survey contained a scale on internet use based on items used in the Belgian version of the EU Kids Online questionnaire (EU Kids Online, 2014). On a 6-point scale, participants had to

indicate how often they had used digital media in the past six months for 11 activities. We used a split-half method to conduct an exploratory factor analysis, followed by a confirmatory factor analysis. Exploratory factor analysis was performed on the first random half of the sample in SPSS. Using principal axis factoring and varimax rotation, the most appropriate solution consisted of three factors: six items related to the use of social and audiovisual media (SAV, e.g., “visiting a social network site”, “watching a video online”, “downloading music or videos”), two items related to online gaming (OG, “playing online games with others”, “playing online games alone or against the computer”), and three items related to the use of digital media for functional purposes (FP, “reading or watching the news online”, “using the internet for school work”, “sending or receiving an email”). Confirmatory factor analysis was performed on the second random half of the sample in Mplus. The model fit-indices indicated poor to acceptable model fit: $\chi^2(1415) = 321.747$, $p < .001$; CFI = 0.930; TLI = 0.906; RMSEA = 0.092 [0.083, 0.101]. Although the fit of this model was not optimal, we chose to proceed with this factor structure because models with more or less factors yielded less clear factor structures and factors that were difficult to interpret.

A structural model was tested in Mplus with digital media use as a mediator between emotions and online social behaviors. We proceeded in the steps recommended by Zhao, Lynch Jr., and Chen (2010), using bootstrap tests for the indirect effects. The model had an acceptable to good fit, except for the χ^2 (which is inflated due to large sample size): $\chi^2(2043) = 9960.121$, $p < .001$; CFI = 0.920; TLI = 0.916; RMSEA = 0.047 [0.047, 0.048]. Figure 2 displays the results of the structural model (only the direct paths).

First, regarding the association between emotions and use of digital media, it appeared that the experience of positive and negative emotions was positively related to the use of social and audiovisual media, and using digital media for functional purposes, but not to gaming. The strength of the associations seemed strongest for the relation between the experience of positive ($b = 0.213$, $p < .001$) and negative ($b = 0.212$, $p < .001$) emotions with the use of social and audiovisual media, than for the relation between the experience of positive ($b = 0.173$, $p < .001$) and negative ($b = 0.085$, $p = .004$) emotions with the use of digital media for functional purposes.

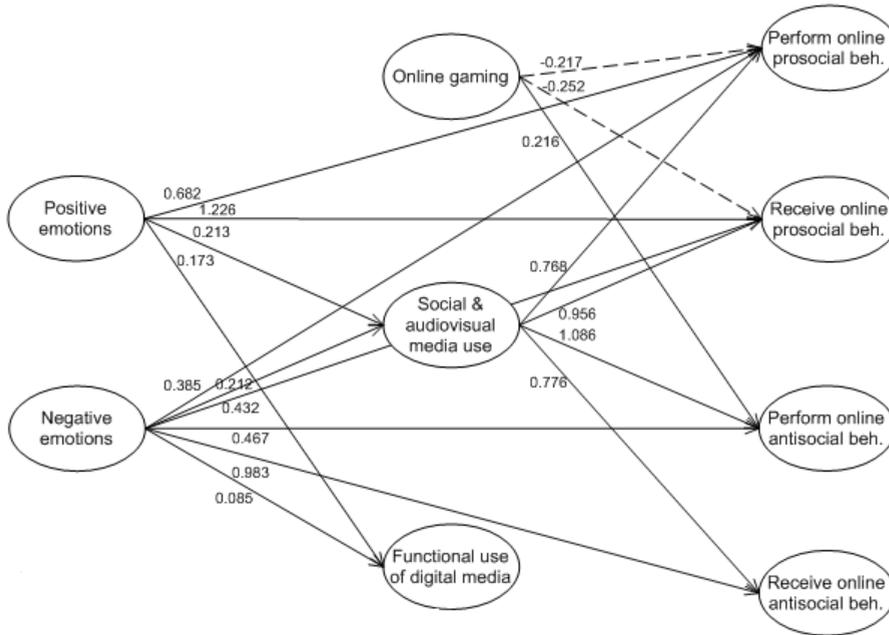


Figure 2. Full tested structural model of the regression of online social behaviors on emotions, mediated by use of digital media, with all nonsignificant paths removed. Numbers indicate unstandardized path coefficients. Dashed lines indicate negative coefficients.

Second, regarding the association between the use of digital media and online social behaviors, only gaming and using audiovisual and social media were related to online social behaviors. The use of digital media for functional purposes did not seem to be related to how adolescents behave online. Gaming was related negatively to performing ($b = -0.217$, $p < .001$) and receiving ($b = -0.252$, $p < .001$) online prosocial behavior, whereas it was positively related to performing online antisocial behavior ($b = 0.216$, $p < .001$). Using social and audiovisual media was strongly positively associated with performing and receiving prosocial as well as antisocial behavior online (POPB: $b = 0.768$, $p < .001$; ROPB: $b = 0.956$, $p < .001$; POAB: $b = 1.086$, $p < .001$; ROAB: $b = 0.776$, $p < .001$).

Table 4

Unstandardized Coefficients of the Direct and Indirect Paths with 95% Confidence Interval From the Bootstrap Analysis

Model path			<i>b</i>	95% CI	Model path			<i>b</i>	95% CI
NE	→	POPB	0.385*	[0.275, 0.497]	PE	→	POPB	0.682*	[0.542, 0.845]
NE	→ SAV	→ POPB	0.163*	[0.110, 0.225]	PE	→ SAV	→ POPB	0.164*	[0.103, 0.237]
NE	→ OG	→ POPB	0.005	[-0.014, 0.029]	PE	→ OG	→ POPB	-0.002	[-0.034, 0.025]
NE	→ FP	→ POPB	0.005	[-0.019, 0.034]	PE	→ FP	→ POPB	0.010	[-0.038, 0.058]
NE	→	ROPB	0.432*	[0.291, 0.576]	PE	→	ROPB	1.226*	[1.1016, 1.503]
NE	→ SAV	→ ROPB	0.202*	[0.143, 0.281]	PE	→ SAV	→ ROPB	0.204*	[0.129, 0.301]
NE	→ OG	→ ROPB	0.006	[-0.016, 0.032]	PE	→ OG	→ ROPB	-0.002	[-0.041, 0.028]
NE	→ FP	→ ROPB	0.023	[-0.002, 0.068]	PE	→ FP	→ ROPB	0.047	[-0.013, 0.115]
NE	→	POAB	0.467*	[0.316, 0.636]	PE	→	POAB	0.142	[-0.022, 0.370]
NE	→ SAV	→ POAB	0.230*	[0.154, 0.312]	PE	→ SAV	→ POAB	0.231*	[0.133, 0.353]
NE	→ OG	→ POAB	-0.005	[-0.030, 0.012]	PE	→ OG	→ POAB	0.002	[-0.027, 0.030]
NE	→ FP	→ POAB	-0.038	[-0.097, -0.003]	PE	→ FP	→ POAB	-0.078	[-0.177, -0.008]
NE	→	ROAB	0.983*	[0.818, 1.201]	PE	→	ROAB	0.024	[-0.172, 0.231]
NE	→ SAV	→ ROAB	0.164*	[0.089, 0.274]	PE	→ SAV	→ ROAB	0.165*	[0.087, 0.269]
NE	→ OG	→ ROAB	-0.001	[-0.013, 0.002]	PE	→ OG	→ ROAB	0.000	[-0.006, 0.009]
NE	→ FP	→ ROAB	-0.007	[-0.054, 0.039]	PE	→ FP	→ ROAB	-0.014	[-0.150, 0.084]

Note. NE = negative emotions; PE = positive emotions; SAV = use of social & audiovisual media; OG = online gaming; FP = use of digital media for functional purposes; POPB = performing online prosocial behavior; ROPB = receiving online prosocial behavior; POAB = performing online antisocial behavior; ROAB = receiving online antisocial behavior.

* $p < .05$.

Next, the indirect effects of experienced emotions on online social behaviors were examined with a bootstrap test. The results, together with the direct effects of emotions on online social behaviors, are displayed in Table 4. The direct and indirect effects need to be evaluated together to determine whether and what type of mediation is present (Zhao et al., 2010). Our findings revealed complementary mediation via SAV of NE and PE on POPB and ROPB and of NE on POAB and ROAB. Furthermore, the results indicated indirect-only mediations of PE on POAB and ROAB via SAV.

DISCUSSION

This study explored adolescents' involvement in online antisocial and prosocial behavior. First, the relation between performing and receiving these behaviors was examined. Next, the influence of emotions on this behavior was analyzed. Last, the mediating effect of the use of digital media was assessed in a post-hoc analysis.

INVOLVEMENT IN ONLINE PROSOCIAL AND ANTISOCIAL BEHAVIOR

The adolescents in our sample reported to be more involved in online prosocial than antisocial behavior, in terms of undergoing this behavior when done by others, as well as performing this behavior themselves. It is remarkable that the amount of research devoted to online antisocial versus prosocial behavior is almost opposite to the actual occurrence of this behavior. Furthermore, participants also experienced more positive than negative emotions. Together, these findings suggest that most youngsters had more positive than negative experiences, both online as well as offline.

The fact that youngsters behaved more prosocially than antisocially online corroborates previous findings that youngsters engage more in opportunity- than risk-related activities online (Livingstone, Haddon, Görzig, & Ólafsson, 2011) and goes against the common perception of the internet as a dangerous place for children and adolescents (e.g., Whitaker & Bushman, 2009). Apparently, digital media not only provide youngsters with a range of opportunities to develop their identity, communicate with others, and maintain peer

relationships, youngsters also use digital media to help and benefit others. Moreover, they use the internet more often for this purpose than to harm or bother others.

INFLUENCE OF EMOTIONS

Previous literature has documented predictions of offline antisocial behavior by negative emotionality (e.g., Chen et al., 2000), of online antisocial behavior by anger (e.g., Ak et al., 2015), and of offline prosocial behavior by positive emotions (e.g., Bartlett & DeSteno, 2006). In our study, adolescents who experienced more emotions, positive as well as negative, performed and received more online social behaviors, prosocial as well as antisocial. Even though the associations of positive emotions with prosocial behavior and of negative emotions with antisocial behavior were stronger than those of positive emotions with antisocial behavior and of negative emotions with prosocial behavior, it was surprising that the experience of negative emotions was positively related to online prosocial behavior and that positive emotions were positively related to online antisocial behavior. These findings seem to suggest that the experience of emotions per se led to more involvement in online social behaviors, receiving as well as performing, and prosocial as well as antisocial. It seems as if the experience of emotions triggered adolescents to turn to digital technologies and use these in a prosocial as well as antisocial manner. Emotions constitute changes in action readiness and motivation, which may or may not lead to action (Frijda, 2004). Online contexts invite people to act out more frequently and intensely than face-to-face contexts (cf., the online disinhibition effect, Suler, 2004), which could explain the association between increased emotionality and performing online social behaviors. What's more, somehow the experience of emotions also elicited online prosocial and antisocial behaviors from others. Could it be that adolescents reacted to their emotions by turning to digital technologies and performing prosocial or antisocial behaviors, which in turn elicited these behaviors from others? And, if so, how in particular did adolescents react to their emotions and what did they do online? Our post-hoc analysis may shed some light on these questions.

USE OF DIGITAL MEDIA AS A MEDIATOR BETWEEN EMOTIONS AND ONLINE SOCIAL BEHAVIOR

We analyzed post-hoc whether the different uses of digital media could be a mediator in the association between experienced emotions and online social behaviors. First of all,

findings revealed that the more negative and positive emotions adolescents experienced, the more they turned to audiovisual and social media, such as instant messaging or watching videos, and the more they used digital media for functional purposes, such as watching the news or working for school. The regression coefficients were the largest for the associations between emotions and the use of audiovisual and social media, suggesting that adolescents were particularly inclined to turn to digital media for entertainment and peer communication purposes when they felt emotional. The positive association of experienced emotions with use of audiovisual media is in line with the literature on mood management theory (Zillmann, 1988). According to this theory, media messages have the potential to influence affective states. Media messages can alter emotional states in a positive or negative direction, depending on their content and congruence with an individual's current state. In this way, media messages can be used to regulate emotion, and individuals may actively seek out particular media messages to alter their emotional state (Zillmann, 1988). Moreover, people's use of digital media is closely related to their motivations and goals, such as entertainment or social interaction (van Deursen & van Dijk, 2013). Those motivations mediate the association between emotions and the different uses of digital media, for instance, gaming or using social network sites, because they drive people to a particular activity which may meet one's goals (Kardefelt-Winther, 2014). Perhaps surprisingly, the experience of emotions was not related to online gaming, so it appears as if adolescents who liked online gaming did this regardless of their emotional state. These results are in line with a study by Leung (2007), who found that adolescents preferred to use social media over online games to alleviate negative emotions.

Second, the use of digital media for functional purposes was not, but using digital media to play games online or to access audiovisual and social media was related to online social behaviors. The more adolescents reported to engage in online gaming, the less prosocial they acted online, the less they received online prosocial behavior from others, and the more antisocial they behaved online. Research on the effect of gaming on offline social behaviors has generally shown that gaming can be linked to increases and decreases in offline prosocial and antisocial behavior, depending on the content of the games: violent games increase aggression and decrease prosocial outcomes, whereas prosocial games

have the opposite effect (Greitemeyer & Mügge, 2014). Other authors have proposed that the effect of violent games on increasing aggressive behavior does not depend on the content of the games, but rather on the degree of deprivation of the need for competence, which causes frustration and leads to aggression (Przybylski, Deci, Rigby, & Ryan, 2014). Unfortunately, we do not know what type of games our respondents played and how much their feelings of competence were thwarted, so we cannot make inferences about the effect of the content or the degree of competence-impediment of games on online social behaviors. However, following the findings about offline gaming, it could be that the respondents primarily played violent games or games that thwarted their need for competence, possibly resulting in feelings of frustration, which increased antisocial and decreased prosocial behavior online.

Using digital media to consume audiovisual media messages or to access social media was strongly positively related to all types of online social behaviors. In other words, the more adolescents used digital technologies for entertainment or informal communication purposes, the more prosocially and antisocially they behaved online and the more prosocial and antisocial reactions they received from others. With regard to the use of audiovisual media, in line with the findings about the effect of the content of games, it is plausible that consuming violent audiovisual media messages would increase antisocial behavior and that consuming positive audiovisual media messages would increase prosocial behavior. Performing these behaviors could in turn elicit similar reactions from peers, which would explain why the receiving of these behaviors also increased after using audiovisual media. The connection between antisocial media content and subsequent antisocial behavior is also supported in a study by den Hamer, Konijn, and Keijer (2014), who found evidence for a cyclic process model from victimization-based anger through exposure to antisocial media content to cyberbullying perpetration. Regarding the use of social media, social network sites and instant messaging apps are ultimate venues for prosocial and antisocial exchanges. It is not surprising that an increase in the use of these platforms led to an increase in performing and receiving online social behaviors, as their primary purpose is to enable communication and social interactions online. In support of this, research on cyberbullying

has shown that the more adolescents use social network sites, the more likely they are to become involved in cyberbullying (Meter & Bauman, 2015).

Third, the analysis of the indirect effects of experienced emotions on online social behaviors via the different uses of digital media showed that there was complementary mediation via the use of social and audiovisual media of the experience of negative and positive emotions on performing and receiving prosocial behavior, and of negative emotions on performing and receiving online antisocial behavior. Complementary mediation means that there is a direct effect of experienced emotions on online behavior, and also an indirect effect in the same direction via the use of social and audiovisual media. Thus, the increase in performing and receiving online prosocial behavior associated with the experience of positive and negative emotions was partially mediated by increased use of social and audiovisual media. Likewise, the increase in performing and receiving online antisocial behavior associated with the experience of negative emotions was also partially mediated by increased use of social and audiovisual media. Furthermore, the analysis also showed that there was an indirect-only (full) mediation of positive emotions on performing and receiving online antisocial behavior via the use of social and audiovisual media. This means that the experience of positive emotions was not directly related to online antisocial behaviors, but that there was an effect via the use of social and audiovisual media. So if adolescents experienced intense positive emotions, they performed and received more online antisocial behavior only if they turned to social and audiovisual media. It thus appears as if the use of digital media for communication and entertainment purposes played a significant role in explaining the connection between the experience of emotions and pro- and antisocial behavior online.

The theory of social sharing of emotion (Rimé, 2009) might be informative in this regard. According to this theory, the experience of emotion fuels the sharing of emotion with others. An important function of the social sharing of emotion is that it enables interpersonal emotion regulation, which involves turning to others to cope with emotions (Zaki & Williams, 2013). Social sharing of emotions can happen face-to-face but also via digital communication channels, such as social network sites (e.g., Bazarova, Choi, Sosik,

Cosley, & Whitlock, 2015). Emotional communication is quite similar across offline and online environments, and is often found to be even more frequent and explicit online than offline (Derks, Fischer, & Bos, 2008). Adolescents are active users of digital technologies and also use digital technologies to share their emotions online. The online sharing of emotions can provide them emotional relief and increase their well-being and satisfaction (Bazarova et al., 2015; Dolev-Cohen & Barak, 2013). However, not all sharing of emotions online elicits positive reactions: when individuals display too much of their affective state or too negative states online, they are less likely to be liked and to receive social support (Bellur, High, & Oeldorf-Hirsch, 2008; Forest & Wood, 2012). Thus, when adolescents express their experienced emotions through social media, the content and amount of their communication influences the reactions they receive from others, and whether those reactions are more likely to be prosocial or antisocial. This could explain why even positive emotions can lead to online antisocial behaviors: if adolescents express their emotions on social media in a way that does not follow the implicit rules and norms of how they should express themselves there, they may elicit antisocial responses from others and (maybe in turn) behave antisocially themselves. It could also explain why negative emotions were associated with online prosocial behaviors: if adolescents express their negative emotionality in a socially acceptable way on social media, they can receive positive reactions and help from others, and strengthen the relationships with their peers, resulting in increases of mutual prosocial exchanges.

STUDY LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

First, caution should be applied when interpreting the results regarding the prevalence of online prosocial and antisocial behavior, as these may have been influenced by a social desirability bias. Prosocial behavior is more culturally and morally accepted than antisocial behavior, so it is plausible that participants may have underreported their experiences with antisocial behavior and overstated their experiences with prosocial behavior. More research is needed to confirm our findings. Future research could address the social desirability bias by using other-reports instead of or next to self-reports.

Another limitation of this study is that the analyses are based on cross-sectional data from a sample of Belgian adolescents. Research with adolescents from other countries and

cultures is needed to corroborate or nuance our results. Furthermore, the cross-sectional nature of the data precludes drawing conclusions regarding the causal direction of the association between experienced emotions, uses of digital media and online social behaviors. Online social behaviors could *elicit* emotions and the use of particular media rather than the other way around. In fact, it is likely that there is a bidirectional association between emotions and online social behaviors, such that adolescents experience emotions, which stimulate them to act in a certain way online and which also elicit behaviors from others, consequently prompting the experience of particular emotions. For example, an adolescent might be angry after having a fight with peers in school. When he later goes online, he vents his anger by calling his peers names on a social network site. This behavior causes his peers to do the same to him, which makes him even angrier and also a bit sad. The use of cross-sectional data in mediation analysis is also debatable. Since the present paper is based on data of the first wave of an ongoing longitudinal study, in future research we will make use of the longitudinal data to validate and extend our findings.

Third, our findings from the analysis of the indirect effects revealed complementary mediations of experienced emotions on online social behaviors via the use of social and audiovisual media. Partial or complementary mediation suggests the possible existence of other omitted mediating variables (Zhao et al., 2010). In other words, it is likely that there is or are other variable(s), which were not included in this study, that mediate the associations between emotions and online social behaviors. Future research could benefit from examining other possibly influential mediating variables, such as the content and valence of the media messages adolescents consume and of the social interactions they engage in when they go online.

Fourth, the model fit indices of the structural measurement model of emotions indicated a rather poor model fit. We also tested a model (results not reported here) with the emotion items separately instead of as indicators of the two latent factors, but this resulted in a worse model fit. A more elaborate measure with several items per emotion could enhance the quality of the emotion measurement and of the entire model.

Last, the factor structure of the digital use measure yielded three factors: online gaming, use of social and audiovisual media, and use of digital media for functional purposes. To better disentangle the effects of using social media versus audiovisual media, a measure that clearly separates those two would be useful.

CONCLUSION

Notwithstanding the limitations, overall the study's findings indicate that adolescents' experiences using digital technologies are more often prosocial than antisocial. Adolescents reported high involvement in both performing and receiving prosocial behavior online. These prosocial exchanges were positively, directly and indirectly, associated with experiencing positive as well as negative emotions, whereas online antisocial behavior was directly related to negative emotions but only indirectly to the experience of positive emotions. The indirect associations of experienced emotions with online social behaviors were mediated via the use of digital media for entertainment or communication purposes (i.e., via the use of audiovisual and social media). Thus, it appears that when adolescents experience intense emotions, positive as well as negative, they turn to social and entertaining media, which is associated with performing and receiving prosocial and antisocial behavior online. Using social and audiovisual media may thus be a preferred way for adolescents to deal with their emotions, perhaps because this allows for the social sharing of emotions (Rimé, 2009) and for mood management (Zillmann, 1988), and this in turn increases pro- and antisocial exchanges online.

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CHAPTER 5

FEEL GOOD, DO GOOD ONLINE? SPILLOVER AND CROSSOVER EFFECTS OF HAPPINESS ON ADOLESCENTS' ONLINE PROSOCIAL BEHAVIOR

This chapter is based on the following publication:

Erreygers, S., Vandebosch, H., Vranjes, I., Baillien, E., & De Witte, H. (2018). Feel good, do good online? Spillover and crossover effects of happiness on adolescents' online prosocial behavior. *Journal of Happiness Studies*. doi:10.1007/s10902-018-0003-2

FEEL GOOD, DO GOOD ONLINE? SPILLOVER AND CROSSOVER EFFECTS OF HAPPINESS ON ADOLESCENTS' ONLINE PROSOCIAL BEHAVIOR

Abstract

Although the majority of research on adolescents' online behavior has focused on antisocial behavior such as cyberbullying, adolescents more often behave prosocially than antisocially online. Research on offline prosocial behavior has shown that happiness and prosocial behavior are related. Furthermore, spillover-crossover research suggests that emotional states originating in one context can *spill over* to another context and can even *cross over* from one person to another. Therefore, this study examined whether happiness is also related to adolescents' *online* prosocial behavior and whether others' (in this case, parents') happiness also indirectly, via transmission to adolescents' own happiness, predicts adolescents' online prosocial behavior. Via a daily diary method, the associations of adolescents' own happiness and their parents' happiness with adolescents' online prosocial behavior were tested on a daily level. The findings suggest that, on a daily level, happiness creates a ripple effect whereby adolescents and parents take their positive emotional states from school and work home, and adolescents act on their happiness by behaving more prosocially online. The strongest spillover and crossover effects were found for girls and their mothers, evoking questions for future research to understand these gender differences.

INTRODUCTION

Adolescents are avid users of digital technologies: According to the 2015 Pew Research Center Report, 92% of teenagers report going online daily and 24% say they go online “almost constantly” (Lenhart, 2015). Furthermore, in 2015, 91% of teenagers with a mobile phone made use of text-messages and 76% used social media (Lenhart, 2015). It thus appears that adolescents make high use of digital technologies for social activities. Much previous research has focused on adolescents’ antisocial use of digital media, e.g., cyberbullying (for a review, see Kowalski, Giumetti, Schroeder, & Lattanner, 2014). However, adolescents also behave prosocially online (Erreygers, Vandebosch, Vranjes, Baillien, & De Witte, 2017; Lister, 2007; Wang & Wang, 2008). In fact, research has revealed that online prosocial behavior is more prevalent among adolescents than online antisocial behavior (Erreygers et al., 2017; Lister, 2007).

Evidence from previous studies with samples from all ages has indicated that offline prosocial behavior and happiness are related (Aknin, Broesch, Hamlin, & Van de Vondervoort, 2015; Aknin, Hamlin, & Dunn, 2012; S. K. Nelson, Layous, Cole, & Lyubomirsky, 2016; Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006). Moreover, happiness and prosocial behavior have been found to mutually reinforce each other through a positive feedback loop, with prosocial spending increasing happiness and vice versa. For instance, it has been shown that prosocial spending (i.e., spending money on someone else) increases happiness, which in turn stimulates prosocial spending (Aknin et al., 2013; Aknin, Dunn, & Norton, 2012). The link between happiness and prosocial behavior ties in to the Broaden-and-Build Theory (Fredrickson & Joiner, 2002), which posits that experiencing positive emotions broadens people’s perspectives and actions and thereby builds enduring biopsychosocial resources and relationships. For instance, happiness can stimulate people to think of others and do good for them, fostering relationships. Interestingly, to date it has not been studied whether the association of happiness with (offline) prosocial behavior can be generalized to online prosocial behavior. Therefore, in this study we will examine whether happiness is associated with online prosocial behavior in adolescence.

Another aspect regarding the association between happiness and prosocial behavior that has not received attention, pertains to whether the association traverses contexts and transmits between individuals. Investigating this topic would tie in with the idea that emotional states originating in one context can *spill over* to another context (Bakker, Westman, & van Emmerik, 2009) and can even *cross over* from one person to another (Lawson, Davis, McHale, Hammer, & Buxton, 2014; Rodríguez-Muñoz, Sanz-Vergel, Demerouti, & Bakker, 2014). Consequently, we examine whether others' (in this case, parents') happiness also indirectly, via transmission to adolescents' own happiness, predicts adolescents' online prosocial behavior. Via a daily diary method, the associations of adolescents' own happiness and their parents' happiness with adolescents' online prosocial behavior will be tested on a daily level.

ADOLESCENTS' ONLINE PROSOCIAL BEHAVIOR

Online prosocial behavior refers to “voluntary behavior carried out in an electronic context with the intention of benefitting particular others or promoting harmonious relations with others” (Erreygers, Vandebosch, Vranjes, Baillien, & De Witte, 2018a). Examples of online prosocial behavior include comforting a friend via digital technologies, online sharing of resources and information with a classmate, and helping peers out on social network sites.

So far, only a few studies have explored the antecedents of online prosocial behavior (Erreygers et al., 2017; Erreygers, Vandebosch, Vranjes, Baillien, & De Witte, 2018b; Lee, Kim, & Cho, 2014; Wright, 2014; Wright & Li, 2011). These have reported that females report more online prosocial behavior than males (Ferenczi, Marshall, & Bejanyan, 2017; Lister, 2007), and that online prosocial behavior is associated with offline prosocial behavior (Lister, 2007; Wright & Li, 2011), perceived popularity and social preference (Wright, 2014), being the recipient of online prosocial behavior (Erreygers et al., 2018b), frequency of using digital technologies (Erreygers et al., 2017; Lister, 2007; Wright & Li, 2011), relational self-construal (i.e., the extent to which individuals define their identity through their social relationships; Ferenczi et al., 2017), altruism and reciprocity (Wang & Wang, 2008), and positive and negative emotions (Erreygers et al., 2017). Most of these studies used interindividual (or between-subjects) analyses, which provide information on the level of the population (Molenaar & Campbell, 2009). However, interindividual analyses do not

provide information on the individual level, i.e., whether those variables are associated with each other *within* rather than between persons (Molenaar & Campbell, 2009). To examine person-specific processes, for example, whether someone's emotions are associated with his or her online prosocial behavior later that day, intraindividual analyses are needed. Diary studies are suited for these kinds of analyses, as they allow for multiple measurements of the same individual over time (Bolger, Davis, & Rafaeli, 2003). Therefore, using a daily diary approach, this study examined whether adolescents' online prosocial behavior is predicted by happiness within days.

SPILLOVER AND CROSSOVER OF EMOTIONS

Spillover and crossover processes within families have been reported in many studies (e.g., Bakker, Demerouti, & Burke, 2009; Flook & Fuligni, 2008; J. A. Nelson, O'Brien, Blankson, Calkins, & Keane, 2009). Spillover refers to the transmission of emotional states from one context (e.g., work or school) to another context (e.g., home) within individuals. Crossover refers to the transmission of emotional states between individuals (e.g., from parents to their children). Notably, the majority of the spillover and crossover research has examined negative spillover and crossover effects for stress and negative emotional states (Bakker, Westman, et al., 2009). For instance, early adolescents' experience of stressful events in the family has been shown to increase the likelihood of subsequent negative academic-related and leisure events later that day (e.g., Salamon, Johnson, & Swendsen, 2011). However, a few studies tapping into these mechanisms have revealed that spillover and crossover also occur for positive states (e.g., Lawson et al., 2014; Matjasko & Feldman, 2005; Mauno, Hirvonen, & Kiuru, 2018; Rodríguez-Muñoz et al., 2014). For example, Lawson and colleagues (2014) found that when mothers on average reported more positive work experiences, their children reported that their mothers displayed lower levels of negative mood after work. Moreover, mothers' positive mood after work was also associated with their children's positive affect and their quality and quantity of sleep (Lawson et al., 2014). Similarly, a survey study among 671 Finnish mother-child dyads reported that mothers' work engagement and recovery from work was associated with their life satisfaction and closeness with their children, which was in turn linked with their children's life satisfaction (Mauno et al., 2018).

The crossover of emotions has also been referred to as emotional transmission. According to Larson and Almeida (1999, p. 6) “emotional transmission occurs when events or emotions in one family member’s immediate daily experience show a consistent predictive relationship to subsequent emotions or behaviors in another family member”. Research has already shown that both parents (Doby & Caplan, 1995) and children (Repetti, 1996) bring their emotions back home from work and school, respectively. In addition, several studies have supported the existence of emotional transmission within families, and there appears to be a stronger transmission of emotions from parents to children than the other way around (R. W. Larson & Almeida, 1999). While some researchers have suggested that fathers’ emotions have the strongest impact on the emotions of other family members (R. W. Larson & Almeida, 1999), studies have also shown that mothers’ emotions are transmitted to their adolescent children (Downey, Purdie, & Schaffer-Neitz, 1999; R. W. Larson & Gillman, 1999). Some studies have even reported stronger transmission effects from mothers to their children (Matjasko & Feldman, 2005), particularly from mothers to their daughters (R. Larson & Richards, 1994).

PRESENT STUDY

In this study we examine spillover and crossover effects of adolescents’ and their parents’ daily happiness on adolescents’ online prosocial behavior via a daily diary (see Figure 1). For five consecutive school/work days, adolescents and their parents completed a short diary twice a day: right after school/work (T1), and at home at the adolescent’s bedtime (T2)¹.

In accordance with previous research on the spillover of emotions, our first hypothesis (H1) is: *Spillover: adolescents’ happiness after school predicts their happiness at home*. Further, following the literature on crossover and emotional transmission from parents’ emotions to their adolescent children’s emotions, we hypothesize (H2): *Crossover: parents’ happiness after work predicts their children’s happiness at home*. Lastly, consistent with previous studies that have documented positive associations between positive emotions and prosocial behavior, the third hypothesis (H3) is: *Adolescents’ happiness at home predicts their online prosocial behavior*. When combined, these hypotheses result in a mediation model in which adolescents’ and parents’ T1 happiness predicts adolescents’ T2 online prosocial behavior via their T2 happiness. Multigroup analyses will be conducted in order

to be able to examine possible gender differences in spillover and differences between dyads in crossover.

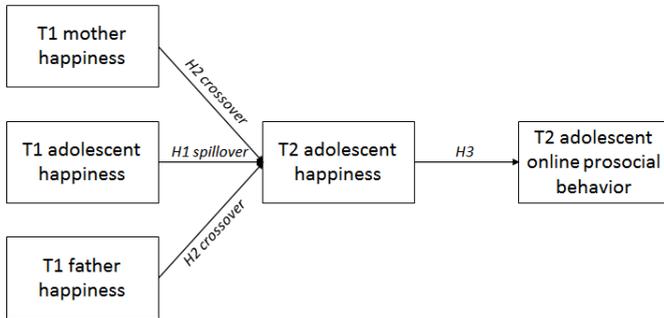


Figure 1. Diagram of the hypotheses of the spillover and crossover of happiness and its effect on online behavior.

Because previous research has shown that the more adolescents use digital technologies, the more online prosocial behavior they display (Erreygers et al., 2017; Lister, 2007; Wright & Li, 2011), we added the use of digital technologies as a control variable.

Our hypotheses are tested in a daily diary study. Diary methods are ideally suited for spillover and crossover studies, as they can capture events and experiences as they unfold over time in their natural context (Bolger et al., 2003). The use of a diary enables us to examine the dynamic nature of work and school experiences and their association with subsequent happiness at home and online prosocial behavior. Diaries also limit the likelihood of retrospection, as the time span between the event or experience and the report thereof is considerably reduced (Bolger et al., 2003). Furthermore, the repeated-measures design of diary studies allows for within-person analyses, next to traditional between-person associations (Bolger et al., 2003). Because individuals are followed and repeatedly measured over the course of time, diary methods can capture temporal sequences while simultaneously taking into account individuals' prior levels of the dependent variables.

METHOD

PROCEDURE

In a time based-design, participants reported on their emotions and online prosocial behavior. Participants were assessed twice daily during five consecutive school/working days (Monday–Friday) for a period of one school/working week. They completed the diary once right after school (for adolescents) or work (for parents) (T1) and once right before the child went to bed (T2). Happiness was assessed at T1 and T2, and online prosocial behavior at T2. Participants completed the diaries electronically via their smartphone or their computer.

Before the start of the study, the participants were thoroughly informed about the whole process (i.e. the duration of the study, how to access the diaries, and when to complete them). They also received a test link to inspect the compatibility of the electronic diary with their device. During the diary week, the participants received a text message or email twice each day to remind them to complete the diaries, at a time point which they had indicated was most appropriate for them. Confidentiality of all individual responses was guaranteed. The study was approved by the Ethics Committee for the Social Sciences and Humanities of the KU Leuven.

PARTICIPANTS

The sample consisted of 136 families (98 two-parent families, 38 families in which only one parent participated) from the Flemish (Dutch-speaking) part of Belgium. To be eligible for the study, families had to have at least one child in the first or second grade of secondary school (equivalent to US grade 7 or 8) and any parent living with the child had to be employed part-time or full-time (because we wanted to examine parents' happiness elicited by the work context). Only the (biological or step-)parents who lived with the child during the diary week were asked to participate. Initially, 36 families were recruited by the first two authors via four secondary schools, two universities, and social media. To reach a higher number of participants, 100 additional families were recruited via a market research agency. Families received a € 100 incentive for participation if all family members completed at least 80% of the diaries.

The participants were 136 adolescents (67 boys, 69 girls) and 234 working parents (126 biological mothers, 96 biological fathers, four stepmothers, six stepfathers, one foster mother, and one adoption mother). The children were on average 13.51 years old ($SD = 0.63$) and the parents 44.15 years old ($SD = 4.66$).

Of the parents, 66.2% were married, 18.4% were cohabiting, 12.0% were divorced or separated, 0.9% were widowed, and 2.6% were single parents. 68.4% of the parents worked full-time, 31.6% part-time. The majority of the parents had completed higher education (71.8%). Almost half of the families (47.4%) were households with three (biological or step-) children, 2.1% were one-child families, 25.2% were families with two children, 21.8% with four children, 3.0% with five children, and one family consisted of eight children. In 99% of the families parents and their children spoke Dutch with each other at home. French ($N = 3$), English ($N = 3$), Spanish ($N = 2$), Swedish ($N = 1$), and Chinese ($N = 1$) were the other languages children spoke at home, in addition to or instead of Dutch.

MISSING DATA

Most participants completed all the diaries at both times points. A few missings were due to technical problems (not receiving a reminder to complete the diary in time). Further, not all diary entries were completed at the requested time points. For T1 (right after school/work), diaries that were completed less than one hour before T2, or after 9:00pm for the adolescents were omitted. For T2 (at adolescents' bedtime), diaries that were completed before 8:00pm were not analyzed (because the average bedtime for Flemish adolescents this age is 9:30pm; Van den Bulck, 2004), as well as diaries that were completed the following morning. This resulted in the following missing data rates: 22 (3.2%) of the adolescents', 8 (1.2%) of the mothers', and 7 (1.4%) of the fathers' entries at T1; and 51 (7.5%) of the adolescents' entries at T2. Full information maximum likelihood (FIML) was used to estimate the model and handle missing data (Enders & Bandalos, 2001).

MEASURES

Because diary studies are demanding for participants, it is important to use brief measures (Cranford et al., 2006); therefore our diary consisted of short or one-item measures assessing the main concepts.

HAPPINESS (T1 AND T2)

Both adolescents and parents rated their current level of happiness on a 5-point Likert-type scale from 1 (*Not at all*) to 5 (*Very strong*).

ONLINE PROSOCIAL BEHAVIOR (OPB; T2)

Five items assessed adolescents' online prosocial behavior (e.g., "Cheering up, comforting or supporting someone via the internet/mobile phone", "Helping or offering help to someone via the internet/mobile phone"). These items were based on the Online Prosocial Behavior Scale (Erreygers et al., 2018a), a scale which was developed specifically to measure adolescents' online prosocial behavior. The OPBS was shortened and modified for diary use. On a 5-point Likert-type scale ranging from 1 (*Not at all*) to 5 (*Very much*), adolescents rated how often they had demonstrated these behaviors online after they came home from school. The items were summed per day per person to create an online prosocial behavior index, with a minimum of 5 and maximum of 25.

USE OF DIGITAL TECHNOLOGIES (UDT; T2)

Adolescents rated how often they had used digital technologies for interpersonal contact (e.g., use of social network sites, instant messaging, emailing, texting) throughout the day, on a 5-point Likert-type scale ranging from 1 (*Not at all*) to 5 (*Very much; more than two hours*).

ANALYSES

Due to the nested two-level nature of the daily diary data (i.e., repeated measures nested within persons/families), multilevel analysis was used to test the hypotheses. The hypotheses were combined in a mediation model of T1 happiness predicting T2 OPB via T2 happiness. To test this model, we conducted a mediation analysis in Mplus 8.0 (Muthén & Muthén, 2017) using a 1-1-1 multilevel structural equation model (MSEM) with fixed slopes (Preacher, Zhang, & Zyphur, 2011; Preacher, Zyphur, & Zhang, 2010), because the predictors (T1 adolescent happiness, T1 mother happiness, and T1 father happiness), mediator (T2 adolescent happiness), and outcome variable (T2 adolescent OPB) were all assessed on the day level (Level 1). This analysis yields path estimates of the direct (T1 happiness – T2 happiness, T1 happiness – T2 OPB, and T2 happiness – T2 OPB) and indirect (T1 happiness

– T2 OPB via T2 happiness) associations. For the indirect effects, we interpret the 90% confidence intervals to correspond to one-tailed, $\alpha < .05$ hypothesis test, as recommended by Preacher et al. (2010).

MSEM uses a robust maximum likelihood estimation method, which does not assume normality. It also accommodates missing data and unbalanced clusters and generates robust parameter estimates (Preacher et al., 2010). Traditional multilevel regression modeling using manifest variables (MLM) combines between-person and within-person effects in estimating the indirect effect, thereby conflating or biasing the estimate. In contrast, in MSEM, Level-1 predictor and mediator variables are decomposed into two uncorrelated latent variable parts (Preacher et al., 2010). This means that each manifest Level-1 variable is implicitly separated into latent within and between components. In other words, pure within-person relationships at Level 1 and pure between-person relationships at Level 2 are estimated. Figure 2 shows a diagram of the tested model (for clarity, only T1 adolescent happiness is shown, but T1 father and mother happiness were also included in the analysis, and T2 use of digital technologies was included as control variable).

This model allows testing the hypotheses at two levels: within-person (i.e., day-level) and between-person. At the within-person level, the model examines whether daily variations from adolescents' own mean level of happiness after school and from their parents' mean levels of happiness after work predict adolescents' happiness and online prosocial behavior at home later that day. In other words, it examines within-day associations between happiness after school or work, happiness at home, and OPB. At the between-person level, the model examines whether adolescents' and parents' average happiness after school or work influences adolescents' mean level of happiness and OPB, across days. Stated differently, it examines average associations between happiness after school or work, happiness at home, and OPB.

To test hypothesis 2 (crossover), we analyzed whether T1 father happiness and T1 mother happiness predicted T2 adolescent happiness, controlling for adolescents' own T1 happiness. Again, both within- (i.e., whether T1 daily variation in happiness predicts T2 daily

variation in happiness) and between-person (i.e., whether family members' mean level of T1 happiness predicts adolescents' mean level of T2 happiness) effects were modeled.

Multigroup analysis was conducted to examine differences between parent-daughter and parent-son dyads.

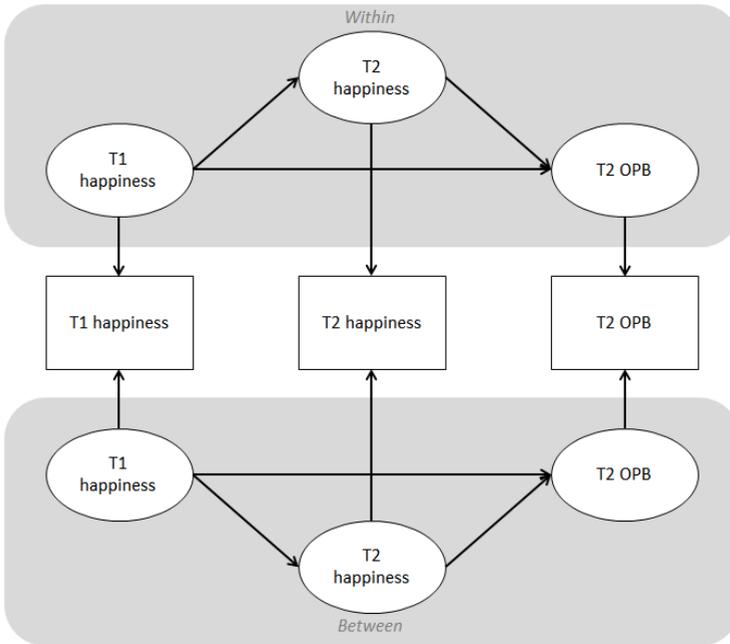


Figure 2. Simplified diagram of the 1-1-1-mediation model of adolescents' happiness and online prosocial behavior.

RESULTS

DESCRIPTIVE ANALYSES

Table 1 shows the means, standard deviations, and correlations of the study variables, taking into account that each participant contributed multiple observations. In order to estimate the relative amount of between-person and within-person variance in the outcome variables, the intraclass correlation coefficient (ICC) was calculated based on an unconditional random coefficient model. The ICC was 68.7%, meaning that 68.7% of the total variance in OPB was attributable to between-person level variance.

Table 1
Means, Standard Deviations, and Correlations

		<i>M</i>	<i>SD</i>	1	2	3	4	5
Adolescents								
1	T1 Happiness	3.56	1.08					
2	T2 Happiness	3.46	1.08	0,65***				
3	T2 OPB	9.92	4.64	0,14*	0,20***			
4	T2 UDT	3.46	1.06	-0,04	0,02	0,39***		
Fathers								
5	T1 Happiness	3.02	1.03	0,32***	0,28***	-0,01	-0,14*	
Mothers								
6	T1 Happiness	3.12	1.01	0,25***	0,28***	0,02	-0,01	0,32***

Note. OPB = online prosocial behavior; UDT = use of digital technologies. All numbers are within-level statistics (each participant is given equal weight, independent of the number of contributed observations).

* $p < .05$, ** $p < .01$, *** $p < .001$.

MODEL TESTING

The multigroup 1-1-1 multilevel SEM mediation model allowed for tests of all hypotheses simultaneously. The results of this model are displayed in Table 2 and 3. The control variable (use of digital technologies) was significantly associated with online prosocial behavior both within- and between-persons, for boys and for girls.

HYPOTHESIS 1: SPILLOVER

As a test of the spillover hypothesis (H1), the direct associations between adolescents' T1 happiness and their T2 happiness were examined (see Table 2). For boys and girls, both within- and between-persons, there was a significant positive effect of T1 happiness on T2 happiness, confirming H1. In other words, on days that adolescents reported higher than (their own) average levels of happiness after school, they also reported higher levels of happiness at home later that day (within-person level). Additionally, adolescents who reported higher than average happiness levels after school overall (across days), also reported higher than average happiness levels at home (between-person level).

HYPOTHESIS 2: CROSSOVER

To test the crossover hypothesis (H2), the direct associations of fathers' and mothers' T1 happiness with their adolescents' T2 happiness were examined, controlling for adolescents' self-reported T1 happiness (see Table 2). Only the within-person association between

mothers' T1 happiness and their daughters' T2 happiness was significant, indicating that on days that mothers were happier when they returned from work, their daughters felt happier at home later that evening.

Table 2
Direct Effects of the Multigroup 1-1-1 MSEM Mediation Model with Fixed Slopes

	Boys			Girls		
	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i>	<i>SE</i>	<i>p</i>
Within-person level						
T2 happiness						
T1 happiness	0.286	0.071	0.000	0.295	0.065	0.000
T1 happiness father	0.074	0.059	0.210	0.030	0.068	0.664
T1 happiness mother	0.019	0.071	0.793	0.181	0.045	0.000
T2 OPB						
T2 happiness	0.228	0.198	0.250	0.828	0.282	0.003
T1 happiness	0.119	0.291	0.684	0.021	0.216	0.924
T1 happiness father	-0.217	0.205	0.289	-0.179	0.295	0.543
T2 happiness mother	0.147	0.213	0.490	-0.032	0.236	0.893
T2 UDT	1.008	0.262	0.000	0.518	0.215	0.016
Between-person level						
T2 happiness						
T1 happiness	1.115	0.073	0.000	0.955	0.064	0.000
T1 happiness father	-0.065	0.079	0.410	0.009	0.069	0.900
T1 happiness mother	0.002	0.134	0.987	0.097	0.076	0.201
T2 OPB						
T2 happiness	2.530	34.293	0.941	6.843	22.772	0.764
T1 happiness	-1.378	38.412	0.971	-4.982	21.918	0.820
T1 happiness father	0.388	2.360	0.869	-0.336	1.419	0.813
T2 happiness mother	-0.341	0.834	0.682	-1.046	2.311	0.651
T2 UDT	1.529	0.381	0.000	2.961	0.625	0.000

Note. OPB = online prosocial behavior; UDT = use of digital technologies. Significant effects are printed bold.

HYPOTHESIS 3: HAPPINESS – ONLINE PROSOCIAL BEHAVIOR

The third hypothesis predicted that adolescents' happiness would be positively associated with their OPB. This hypothesis was only confirmed within-persons for girls: On days that girls reported more happiness at home, they reported more OPB (see Table 2). (Happiness at home and OPB were both measured at T2, indicating a cross-sectional association.)

Table 3
Indirect Effects of T1 Adolescent, Father, and Mother Happiness via T2 Happiness on T2 Online Prosocial Behavior

	Boys			Girls		
	<i>b</i>	<i>SE</i>	90% CI	<i>b</i>	<i>SE</i>	90% CI
Within-person level						
Adolescent	0.065	0.058	[-0.031, 0.161]	0.244	0.105	[0.071, 0.418]
Father	0.017	0.019	[-0.014, 0.048]	0.025	0.058	[-0.071, 0.120]
Mother	0.004	0.016	[-0.022, 0.031]	0.150	0.068	[0.037, 0.262]
Between-person level						
Adolescent	2.820	38.228	[-60.065, 65.705]	6.533	21.796	[-29.321, 42.388]
Father	-0.165	2.206	[-3.794, 3.464]	0.059	0.538	[-0.826, 0.944]
Mother	0.006	0.353	[-0.574, 0.586]	0.665	2.158	[-2.885, 4.215]

Note. Significant effects are printed bold.

MEDIATION

Indirect effects of adolescents' own, their fathers' and their mothers' T1 happiness predicting adolescents' T2 OPB via adolescents' T2 happiness were examined as a test of mediation (see Table 3). Two significant indirect effects were found for girls: Within-persons, girls' own and their mothers' T1 happiness predicted their T2 OPB via girls' T2 happiness. Stated differently, on days that girls felt happier after school or that their mothers were happier after work, they behaved more prosocially online, and this association was explained by girls' higher happiness at home².

DISCUSSION

This study examined whether, on a daily basis, adolescents' and their parents' happiness after school or work influences adolescents' later happiness at home and their online prosocial behavior (OPB) via a five-day diary study conducted among 136 families. Results suggest that adolescents' school-related happiness predicted their happiness at home later that day, indicating a spillover effect of happiness from school to home. Also across days, adolescents' average levels of school-related happiness were positively associated with their average happiness at home. Moreover, within days, girls' (but not boys') happiness at home was linked with their OPB. Further, on days that mothers reported higher work-related happiness, their daughters were happier in the evening at home, indicating a

crossover effect of mothers' happiness to their daughters' happiness. Lastly, mediation analyses suggest that girls' happiness at home explained the association between girls' own and their mothers' school- or work-related happiness, and girls' OPB at the day level.

Our results firstly indicate that adolescents were happier at home on days that they felt happier at school. These results are consistent with previous research indicating that affective experiences can be carried over from one context to the other, such as happiness from the work to the home context (Matjasko & Feldman, 2006) and stress from the school to the family context (Flook & Fuligni, 2008). However, to the best of our knowledge this is the first study to document a happiness spillover effect from school to home in adolescents. Our findings indicate that not only adolescents' negative states are transferred from school to home; also their positive states are carried over to the family context. From a different perspective, this spillover effect could also be considered a special case of temporal stability across contexts. Future research could compare the relative strength of happiness spillover (T1 in context 1, T2 in context 2) and stability (T1 and T2 in the same context) to provide a stronger test of a spillover effect between contexts.

Furthermore, our results suggest that adolescents who reported higher than average levels of school-related happiness also reported higher than average levels of happiness at home across days. These findings are an indication of the stability of happiness across days and contexts, which is consistent with the literature indicating that people differ in their average levels of happiness (Lyubomirsky & Tucker, 1998). These individual differences in overall happiness seem to be related to cognitive processes: "Happy individuals perceive, interpret, and subsequently think about life events and life circumstances in more positive ways than do unhappy ones" (Lyubomirsky & Tucker, 1998, p. 179). Nevertheless, even when taking these mean differences in happiness into account (i.e., overall individual happiness stability), within days and within persons, deviations from adolescents' own mean level of school-related happiness were linked with deviations from adolescents' own mean level of happiness at home, supporting a happiness spillover effect (or within-person daily happiness variability).

Our results further indicate that happiness is transmitted from mothers to daughters: Girls' happiness at home was predicted by their mothers' work-related happiness at the daily level. There were neither significant crossover effects to sons nor from fathers to their sons or daughters. These results corroborate with those of Matjasko and Feldman (2005), who found that mothers' happiness when returning home from work was transmitted to their adolescent children's happiness later at home, whereas there were no significant father-adolescent crossover effects. Larson and Richards (1994) also found the strongest crossover effects in mother-daughter dyads. The strong crossover effect from mothers may be explained by the fact that mothers are often more involved in parenting their adolescent children than fathers (Paulson & Sputa, 1996), and that mothers are particularly important sources of advice and understanding (Greene & Grimsley, 1990; Richardson, Galambos, Schulenberg, & Petersen, 1984). Additionally, research has shown that mothers are more involved in the emotional lives of their children than fathers (Klimes-Dougan et al., 2007), that they talk more with their daughters than with their sons (Leaper, Anderson, & Sanders, 1998), and that they focus more on positive versus negative emotions with their daughters (Fivush, 1989). A possible explanation for the lack of happiness transmission from fathers to their children is that fathers on average spend less time at home with their children (Craig, Powell, & Smyth, 2014). Our diaries included a question on the time spent with each other each day, but unfortunately adding this variable and its interaction with parents' happiness to the model resulted in model estimation issues, so we could not evaluate this possibility. Another explanation that has been suggested is that even if fathers spend time with their children, they interact less with them, decreasing the likelihood of emotional crossover (Matjasko & Feldman, 2005).

Another finding of this study is that girls' (but not boys') happiness at home was associated with their OPB at the daily level. Stated differently, on days that girls felt happier, they behaved more prosocially online. This finding is consistent with that of Erreygers et al. (2017), who reported a positive association between adolescents' positive emotions and their OPB as well. Previous research on offline prosocial behavior has also indicated that prosocial behavior and happiness are related (Aknin et al., 2015; Aknin, Hamlin, et al., 2012; S. K. Nelson et al., 2016; Otake et al., 2006) and mutually reinforce each other, forming a

positive feedback loop (Aknin et al., 2013; Aknin, Dunn, et al., 2012). More generally, a positive feedback loop between positive emotions and positive behavioral experiences has been observed in many studies (e.g., Fredrickson & Joiner, 2002; Garland et al., 2010; Handley, Lassiter, Nickell, & Herchenroeder, 2004; Snippe et al., 2018). A possible explanation for this link between positive affect and prosocial behavior is that prosocial behaviors can be used instrumentally to maintain an already existing positive feeling, referred to as the “feel-good, do-good” effect (Rosenhan, Salovey, & Hargis, 1981). Relatedly, Wegener and Petty (1994) have proposed this is a mood maintenance process by which people in a happy mood seek out positive experiences to maintain or elevate their mood. Further, according to the Broaden-and-Build Theory (Fredrickson & Joiner, 2002) experiencing positive emotions expands people’s mindset (“broaden”), which may stimulate people to think of others and do good for them (“building” relationships and resources). This study is the first to find evidence for the happiness-prosocial behavior link for online prosocial behavior on a daily level.

However, unexpectedly, this association was only significant for girls and not for boys. Previous studies on the association between happiness and prosocial behavior have generally not reported gender differences in this association (Aknin et al., 2013; Aknin, Dunn, et al., 2012; Aknin, Hamlin, et al., 2012). Although there were no gender differences in the respondents’ happiness at home ($M_{\text{boys}} = 3.52$, $M_{\text{girls}} = 3.45$, $t(608) = 0.787$, $p = .431$), boys reported significantly less OPB than girls ($M_{\text{boys}} = 8.83$, $M_{\text{girls}} = 11.07$, $t(562.618) = 6.108$, $p < .001$), which is consistent with gender differences reported in offline prosocial behavior (e.g., Zimmer-Gembeck, Geiger, & Crick, 2005). Perhaps boys’ OPB is less contingent on their affective state than girls’ OPB. Also, previous research has suggested that women are more emotionally expressive online than men, and that they seem to be more concerned with expressing positive and avoiding negative emotions than men, whereas men seem less concerned with being polite and more often violate social norms of online behavior (Derks, Fischer, & Bos, 2008; Fischer, 2011; Herring, 1994). Alternatively, as boys generally play more, and more violent video games than girls (Lenhart et al., 2008; Lenhart, Smith, Anderson, Duggan, & Perrin, 2015), and playing violent video games decreases prosocial behavior (Anderson & Bushman, 2001; Greitemeyer & Mügge, 2014), it could be that the

positive effect of happiness on prosocial behavior does not emerge in boys because of their higher engagement in prosocialness-decreasing violent video games at home, or because the online platforms they use provide less opportunities for prosocial behavior.

Lastly, our results suggest a mediation effect of girls' happiness at home on the association between girls' and mothers' school- or work-related happiness, and girls' OPB later that day. Thus, on days that adolescent girls or their mother were happier when they returned from school or work, girls felt happier later that night at home, and behaved more prosocially online. Firstly, the indirect effect of girls' own happiness on their OPB provides more support for the spillover of happiness from the school to the home context, indicating that happiness is not only transferred from school to home but also to girls' online behavior. Secondly, the indirect association of mothers' happiness via their daughters' happiness on their daughters' OPB illustrates that mothers' happiness is not only transmitted to their daughters' happiness but also influences their daughters' OPB. Thus, happiness seems to engender a ripple effect across contexts, between (female) individuals, and to behavior.

LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Several limitations of this study must be acknowledged. Firstly, this study only examined spillover and crossover of happiness. Perhaps other positive emotions, such as gratitude or forgiveness (Bartlett & DeSteno, 2006; Eisenberg, 2015; Karremans, 2005), may also be transferred between contexts and between persons on a daily level. Future research could explore whether other positive emotions also spill over and cross over and whether happiness influences other emotions.

A second limitation of the study is that our relatively small sample size limited statistical power, which precluded including other possible relevant control variables at the within-person level, and moderator variables at the between-person level. Previous studies have shown that parent-adolescent closeness (Matjasko & Feldman, 2005) and parent-child relationship quality (Bai, Reynolds, Robles, & Repetti, 2017) moderate children's day-level interactions with their parents. Future studies with larger samples could examine the influence of these and other variables on the spillover and crossover of happiness in adolescents.

Thirdly, in the majority of the families that participated in this study, the participating child was not an only child. Although we did not take siblings into account, they may also have influenced the participating adolescents' happiness and OPB, as previous research has shown that having siblings influences emotional understanding and social behavior (Brody, 1996). Studying sibling interactions and influences would be a fruitful area for further work.

Fourthly, because we wanted to assess parents' work-related emotions, families with unemployed parents were excluded from participation. Given that unemployment also has a considerable effect on children's happiness and well-being (Jones, 1988; Powdthavee & Vernoit, 2013), further work is needed to examine whether the associations found in this study also generalize to non-dual worker families. Moreover, the majority of the parents in our sample were higher-educated and almost all families spoke Dutch (national language in Belgium) at home. Further research should confirm whether the findings generalize to lower-educated families and to people from different ethnic backgrounds or to other cultures.

Further, happiness was measured with a single item, whereas it has been argued that multiple-item measures reduce measurement error and increase reliability. However, previous studies have shown that single-item measures of happiness and life satisfaction are highly correlated with multiple-item measures of these constructs and show the same patterns of correlations with other constructs (Abdel-Khalek, 2006; Cheung & Lucas, 2014), demonstrating that "measuring happiness by a single item is reliable, valid, and viable" (Abdel-Khalek, 2006, p. 139). Moreover, the use of single item measures is a common and accepted practice in experience sampling and daily diary research (Fisher & To, 2012). Especially when straightforward unidimensional constructs (e.g., "how happy do you feel right now") are assessed, the use of single items has been argued to be appropriate (Fisher & To, 2012). Previous diary studies have successfully used single item measures of happiness (e.g., Rodríguez-Muñoz et al., 2014).

Finally, happiness at home (T2 happiness) and OPB were assessed at the same time point. For mediation analysis, preferably all variables are measured consecutively, rather than cross-sectionally, to be able to make stronger claims about causality and temporality

(Hayes, 2013). Ideally, our study would have consisted of an extra time point to measure emotions at home before assessing online prosocial behavior. However, to keep the burden for the participants as low as possible in order to maximize the response likelihood, we limited the number of diaries to two per day. The fact that the reverse indirect paths (T1 happiness – T2 OPB – T2 happiness) were not significant, supports the plausibility of the proposed associations.

CONCLUSION

The present study adds to the growing body of research on positive spillover and crossover effects. The findings suggest that happiness creates a ripple effect whereby adolescents and parents take their positive school and work experiences home, and adolescents carry over their happiness by behaving prosocially online. The strongest spillover and crossover effects were found for girls and their mothers, evoking questions for future research to understand these gender differences. We hope the findings of this study inspire future research to further explore the intra- and interpersonal dynamics underlying adolescents' online prosocial behavior, as this behavior can be a powerful counterweight against online antisocial behavior and may in turn promote adolescents' happiness and well-being.

NOTES

¹ This study was part of a larger diary research project on emotions and online behavior in families. As this study focused on adolescents' online prosocial behavior, findings on parent outcome variables will be reported elsewhere (authors, manuscript in preparation).

² We also estimated a mediation model with T2 OPB as mediator of the association between T1 happiness and T2 happiness. However, none of the indirect paths in this model were significant.

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CHAPTER 6

THE INTERPLAY OF NEGATIVE EXPERIENCES, EMOTIONS AND AFFECTIVE STYLES IN ADOLESCENTS' CYBERVICTIMIZATION: A MODERATED MEDIATION ANALYSIS

This chapter is based on the following publication:

Erreygers, S., Vandebosch, H., Vranjes, I., Baillien, E., & De Witte, H. (2018). The interplay of negative experiences, emotions and affective styles in adolescents' cybervictimization: A moderated mediation analysis. *Computers in Human Behavior, 81*, 223–234.
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THE INTERPLAY OF NEGATIVE EXPERIENCES, EMOTIONS AND AFFECTIVE STYLES IN ADOLESCENTS' CYBERVICTIMIZATION: A MODERATED MEDIATION ANALYSIS

Abstract

Cyberbullying research has uncovered several contextual and personal risk factors for cybervictimization, but their interaction has not received much attention. However, the combined influence of several individual and situational factors and the interplay between them may have a different influence on the risk of cybervictimization than each factor separately. Therefore, this longitudinal moderated mediation study, conducted among a large sample of early adolescents, examined how the events adolescents experience in daily life influence their risk of being victimized online via the emotions they experience, and whether this process is moderated by differences in adolescents' habitual tendencies to regulate their emotions (affective styles). The results indicated that negative events were directly and indirectly, via experiencing negative emotions, related to later cybervictimization. Furthermore, the association between negative events and emotions was moderated by concealing and tolerating affective styles: adolescents who habitually concealed or tolerated their emotions were more likely to experience negative emotions associated with negative events, especially when they experienced few negative events. These findings illustrate the importance of taking person-environment-interactions into account when studying cyberbullying and support the implementation of prevention and intervention programs that assist students in developing adaptive emotion regulation and coping skills.

INTRODUCTION

Adolescents are avid users of the internet and are often confronted with online risks such as cyberbullying (Mascheroni & Cuman, 2014). Prevalence estimates vary considerable between studies, but in general between one to four out of ten youngsters report to have been victims of cyberbullying, depending on the definition used, participants' age, country of origin, and reporting time frame (Kowalski, Giumetti, Schroeder, & Lattanner, 2014).

Research on cyberbullying has yielded important insights into the antecedents, correlates and consequences related to online victimization and perpetration (Chen, Ho, & Lwin, 2015; Guo, 2016; Kowalski et al., 2014). Many personal as well as contextual factors that influence the risk of cyberbullying victimization have been identified (Baldry, Farrington, & Sorrentino, 2015; Cross et al., 2015; Kowalski et al., 2014). Broadly, these risk factors can be categorized into two groups: factors relating to individual features, such as demographic attributes, personality traits, motives, attitudes, and affect, and factors relating to situational or contextual features, such as family dynamics, parenting styles, peer influences, school climate, and societal norms and values. As such, cyberbullying can be understood from the framework of the socioecological model (Bronfenbrenner, 1979), which views social phenomena as an interaction of social, physical, institutional, cultural, and community contexts as well as individual characteristics.

However, the interaction between individuals and their environment has largely been neglected in most studies on cyberbullying, which have focused either on personal or situational influences. Yet, it could be that some personal factors moderate the influence of contextual factors on cyberbullying involvement, and vice versa. For instance, the negative effect of a hostile school climate on cyberbullying may be buffered among students who have an optimistic attitude, whereas it may be exacerbated among depressed students. Therefore, studying personal and contextual factors simultaneously may be important to reveal associations and interactions that do not show up when studying the factors in isolation. For this reason, this study aims to take into account the interaction of individual and situational factors by examining how the events adolescents experience in daily life might influence their risk of being victimized online through the emotions they experience

and whether this process is moderated by the way adolescents respond to negative events (*affective style*).

NEGATIVE LIFE EVENTS, AFFECTIVE PROCESSES, AND CYBERBULLYING

Negative experiences in several life domains have been associated with cybervictimization (Guo, 2016). In the peer domain, one consistently found predictor of cyberbullying is previous experience with offline or online victimization (e.g., Juvonen & Gross, 2008; Kowalski et al., 2014; Li, 2007; Vandebosch & Van Cleemput, 2009; Walrave & Heirman, 2011). Peer rejection and low peer support also seem to play a role in cyberbullying (Bayraktar, Machackova, Dedkova, Cerna, & Ševčíková, 2014; Calvete, Orue, Estévez, Villardón, & Padilla, 2010; Katzer, Fetchenhauer, & Belschak, 2009). In the family domain, low parental support, poor parent-child relationships, and family conflict have been associated with cyberbullying victimization (Ortega-Barón, Buelga, & Cava, 2016; Wang, Iannotti, & Nansel, 2009; Ybarra & Mitchell, 2004). In the school domain, low support from teachers, a negative school climate, and the transition from primary to secondary school have been related to cyberbullying (Kowalski et al., 2014; Ortega-Barón et al., 2016; Price & Dalgleish, 2010). In sum, negative contextual factors, whether they are situated at home, at school, or in contact with peers, seem to increase the risk of becoming a target of negative online practices.

In addition to contextual risk factors such as negative life events, several individual characteristics have been associated with increased risk of cyberbullying involvement. Many of these involve affective or emotional factors such as emotion regulation deficits, lack of empathy, depression, and emotional intelligence (Baroncelli & Ciucci, 2014; Cappadocia, Craig, & Pepler, 2013; Gámez-Guadix, Orue, Smith, & Calvete, 2013; Hemphill & Heerde, 2014; Topcu & Erdur-Baker, 2012; Zukauskienė, Steffgen, Pfetsch, König, & Melzer, 2010). Research has also demonstrated the role of specific emotions such as anger and envy in predicting cyberbullying perpetration (Ak, Özdemir, & Kuzucu, 2015; den Hamer, Konijn, Aartsen, Veldhuis, & Spekman, 2015; Hoff & Mitchell, 2009; Lonigro et al., 2015). However, to the best of our knowledge, to date no longitudinal studies have examined the precipitating role of emotions in cybervictimization. Yet, when people experience negative emotions, they might become easy targets of cyberbullying (Vranjes,

Baillien, Vandebosch, Erreygers, & De Witte, 2017). Distressed persons may express their emotions in a socially less accepted way, such as posting too much about their emotional state or disclosing too much negativity, which can elicit negative reactions from others (Bellur, High, & Oeldorf-Hirsch, 2008; Forest & Wood, 2012). Additionally, their emotional expression may show that they are vulnerable, making them “easy” victims (Erreygers, Vandebosch, Vranjes, Baillien, & De Witte, 2016; Vranjes et al., 2017).

We propose that one possible path to connect negative events with cyberbullying runs via the experience of negative emotions. Although there is no one-to-one correspondence between events and emotions across individuals, in general negative events (or events that would generally be evaluated as negative) do elicit negative affect (Larson & Ham, 1993). Therefore, we expect that the experience of negative events, albeit at school, at home, or with peers, will generally elicit negative emotions. Furthermore, negative emotions have been associated with cyberbullying perpetration (den Hamer et al., 2015; den Hamer, Konijn, & Keijer, 2014; Erreygers et al., 2016; Sjørød, Fandrem, & Roland, 2014). In the current study, we aim to examine whether affective processes also play a precipitating role in cyberbullying victimization. Therefore, we hypothesize that:

H1. Negative events predict increased cyberbullying victimization via the experience of negative emotions.

EMOTION REGULATION AND AFFECTIVE STYLES

People have the capacity to regulate their emotions, i.e., emotion regulation. Through emotion regulation, individuals can influence which emotions they have, their timing, their intensity and their expression (Thompson, 1994). There are many different types of emotion regulation strategies (Gross, 2014), but most research to date has been conducted on reappraisal (or changing your way of thinking about an event) and suppression (or changing your behavioral response to an event). Generally it is found that reappraisal is an adaptive strategy that tends to generate positive outcomes, whereas suppression is disadvantageous (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Cutuli, 2014; Gross, 1998; Gross & John, 2003; Webb, Miles, & Sheeran, 2012). However, which emotion regulation strategy is effective is also supposed to be contingent on the specific situation or emotional cue (Haines et al.,

2016; Larsen & Prizmic, 2004). For instance, seeking social support might be an adaptive strategy to cope with fear, but it is probably less effective to regulate anger.

Nevertheless, research has shown that across situations people have individual preferences to use some strategies over others. In other words, individuals seem to differ in the strategies they habitually use, or which strategies they prefer in general across situations and emotions (John & Gross, 2007). These differences in emotion regulation tendencies, or the way in which individuals habitually use emotion regulation strategies, have been described as affective styles (Davidson, 1998). Affective styles can be seen as stable individual tendencies (or traits) to use particular emotion regulation strategies (Hofmann, Sawyer, Fang, & Asnaani, 2012). Affective styles, as individual tendencies, are proposed to influence the process from experiences to emotional response overall, as a predisposing and moderating factor, whereas emotion regulation strategies are used in specific situations and are more context-dependent (or state-like).

In the emotion literature, three affective styles have consistently been identified: concealing, adjusting, and tolerating (Hofmann & Kashdan, 2010). Adjusting refers to the tendency to regulate and re-adjust affect to accommodate to contextual demands, e.g., being able to cheer oneself up after a negative experience. Concealing refers to the habitual tendency to suppress or conceal affect, e.g., not showing to others that one is sad. Tolerating refers to an accepting and nondefensive attitude towards (potentially distressing) affect, e.g., telling oneself that it is ok to be upset.

Propensities in affective styles are associated with interindividual differences in responding to negative events, well-being, and emotional disorders (Davidson, 2004; Hofmann et al., 2012). A propensity to conceal or suppress affect generally seems to lead to negative outcomes, whereas adjusting and tolerating seem to be more adaptive forms of emotion regulation (Aldao et al., 2010; Gross & John, 2003; Hofmann & Kashdan, 2010; Ito & Hofmann, 2014). Furthermore, research consistently indicates that children who fail to adaptively regulate their emotions show increased rates of ostracism, peer rejection, and victimization, but also of aggression, bullying, and antisocial behavior (Eisenberg et al., 1995; Pope & Bierman, 1999; Schwartz & Proctor, 2000; Shields & Cicchetti, 2001).

In previous research on the association between emotion regulation and cyberbullying, it has been found that preadolescent cyberbullies consider themselves less capable of regulating their emotions (Baroncelli & Ciucci, 2014). Furthermore, adolescents who use negative emotion regulation strategies (self-blame, other-blame, rumination, and catastrophizing) to cope with anger seem to be more inclined to perform cyberbullying behavior (den Hamer & Konijn, 2016). Regarding cybervictimization, it seems that being victimized has a negative influence on subsequent emotion regulation (Feinstein, Bhatia, & Davila, 2014; Giancesini & Brighi, 2015). There is also limited evidence that emotional control (a facet of emotion regulation; the ability to manage one's emotional responses and expression) is a risk factor for later cybervictimization (Hemphill & Heerde, 2014; Hemphill, Tollit, Kotevski, & Heerde, 2015). Whether other emotion regulation tendencies influence the risk of cybervictimization, and whether affective styles moderate the association between negative events, negative emotions, and cybervictimization, are questions that have not been answered so far.

Assuming that cyberbullying is related to negative events through individuals' affective reactions to these events, we propose that the interaction between the experience of negative events and a person's affective style will influence which emotions individuals experience and their associated risk of cybervictimization. In other words, we hypothesize that the relationship between negative events and negative emotions will be moderated by affective styles.

In particular, on the one hand we expect that the association between negative experiences and negative emotions will be buffered when adolescents habitually adjust to or tolerate their emotions, as these affective styles have been linked with reductions in negative emotions (Campbell-Sills, Barlow, Brown, & Hofmann, 2006; Gross & John, 2003). On the other hand, we expect that this relationship will be exacerbated when adolescents habitually conceal their emotions, as trait suppression has been associated with increases in negative emotions (Campbell-Sills et al., 2006; Gross & John, 2003).

H2a. The negative effect of negative events on negative emotions will be buffered if adolescents tend to adjust or tolerate their emotions.

H2b. The negative effect of negative events on negative emotions will be exacerbated if adolescents tend to conceal their emotions.

THIS STUDY

Taking all these findings together, we propose a person x context model of cybervictimization in which negative events are linked to cyberbullying victimization through negative emotions, and the relation between negative events and emotions is influenced by affective styles (*Figure 1*). This moderated mediation model integrates previous findings on the influence of contextual factors (events) and personal factors (emotions and affective styles) on victimization of cyberbullying. The model is tested longitudinally using structural equation modeling, on data from a three-wave panel survey study among early adolescents.

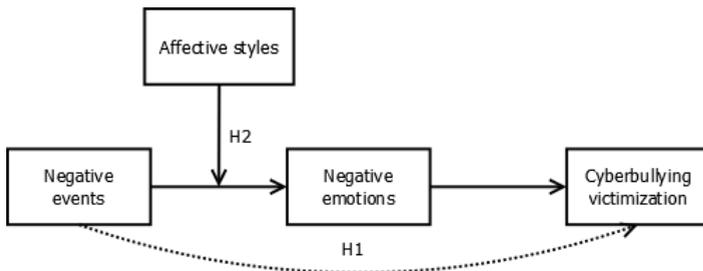


Figure 1. Conceptual model of moderated mediation: Negative events are linked with cyberbullying victimization through the experience of negative emotions, and the association between negative events and emotions is moderated by affective styles.

METHOD

PARTICIPANTS

This longitudinal panel study comprised three data collection waves, spaced approximately six months apart. The data were collected among early adolescents, because previous research has indicated that cyberbullying reaches a peak in this age group (Kowalski et al., 2014). The participants were recruited via their schools. Schools offering secondary

education were randomly selected from the province of Antwerp in Belgium. In total 30 schools were contacted and 13 agreed to participate. For the first data collection (wave 1), which took place in the second semester of the school year, all students from the first grade (equivalent to US grade 7) were surveyed. The second and third data collection (waves 2 and 3) took place during the first and second semester of the following school year, therefore all students from the second grade were surveyed in wave 2 and 3. In total 2,168 Flemish adolescents participated across the three waves. The number of participants per wave was 1,721 in the first, 1,746 in the second and 1,590 in the third wave. Due to practical issues with data collection in the schools, four classes in the first wave, two classes in the second wave, and eight classes in the third wave did not participate. Girls were slightly overrepresented in each wave (54-56%). Participants were on average 13.0 years old in wave 1, 13.6 in wave 2 and 14.1 in wave 3. The majority of the participants were in the general education track and 11 to 14% of participants were in the vocational educational track.

PROCEDURE

After active written informed consent from the schools' principals, all elective students' parents received written information about the study and were asked to provide passive informed consent. The students themselves also received information leaflets and provided their consent. All except 14 students received and provided consent. The study received approval by the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp.

The questionnaires were administered in classes during school hours in the presence of the first author and school personnel. A few schools preferred to administer the questionnaires during spare hours by their own staff, who were thoroughly informed about data collection procedures. Students completed paper-and-pencil or equivalent electronic questionnaires and were encouraged to ask any possible questions they had during administration. To maximize their feelings of anonymity and honesty, students were not asked to provide their names and confidentiality of their answers was emphasized. However, to be able to link their questionnaires across waves, students were asked to provide their gender, date of

birth, and the first letters of their own first name and the first names of their parents. We explained to the students that these data would not be used to identify them but only to link their questionnaires.

MEASURES

NEGATIVE EVENTS

Negative events were assessed with the 18 items on negative life events of the Brief Adolescent Life Events Scale (BALES; Shahar, Henrich, Reiner, & Little, 2003). The original scale consists of 36 items to assess both positive and negative life events in six life domains: family life, close friendships, peer relations and extracurricular activities, school, general performance, and health and appearance (e.g., “I argued with a family member”, “I got a bad grade in school”). The items assess experiences in the past month and have to be rated on a 4-point scale ranging from *Never* to *A lot*.

In our study participants had to rate the entire scale of 36 items (18 positive and 18 negative). However some of the statements about positive events (e.g., “I made up with a family member”) were conditional, which confused many participants: if they had not experienced the event in the past month, then they would have to answer *Never*, but this seemed to contradict their idea that if they *had* experienced the event, they would have answered otherwise (e.g., they always make up with a family member after a fight, but in the past month they did not had a fight so they could not have made up for it). In other words, low scores on these items could indicate both the non-occurrence of predisposing negative events (e.g., a fight) as well as the non-occurrence of the following positive event (e.g., making up after fighting). Therefore, only the negative event items were used in this study.

NEGATIVE EMOTIONS

After the questions on experienced events, participants were asked to rate how often they had experienced each of four negative emotions (anger, jealous, anxious, and sad) in the past month on a 7-point Likert-type scale ranging from *Never* to *(Almost) all the time*.

AFFECTIVE STYLES

Affective styles were assessed using the Affective Style Questionnaire (ASQ; Hofmann & Kashdan, 2010). This scale assesses individuals' tendencies to regulate emotions on three dimensions: *Concealing*, *Adjusting*, and *Tolerating*. The *Concealing* subscale captures habitual tendencies to suppress or conceal affect (e.g., "I often suppress my emotional reactions to things"); the *Adjusting* subscale refers to the tendency to manage and re-adjust affect to accommodate to situational demands (e.g., "I can avoid getting upset by taking a different perspective on things"); and the *Tolerating* subscale comprises an accepting and tolerating attitude towards affect (e.g., "I can tolerate having strong emotions") (Hofmann & Kashdan, 2010). Participants were asked to rate how they usually behave on a 5-point Likert-type scale ranging from *Not true of me at all* to *Extremely true of me*.

CYBERBULLYING VICTIMIZATION

The victimization subscale of the European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Del Rey et al., 2015; Schultze-Krumbholz et al., 2015) was used to measure cyberbullying victimization. Participants had to rate how often they had experienced each of 11 statements about cyberbullying victimization in the past month on a 5-point Likert-type scale ranging from *Never* to *Every day* (e.g., "Someone said nasty things to me or called me names using texts or online messages"). One item ("Someone posted embarrassing videos or pictures of me online") was excluded from analyses because participants explained they often do this to each other for fun on Facebook when it is someone's birthday.

ANALYSIS

ANALYTIC STRATEGY¹

Exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modeling (SEM) were run in Mplus 8 (Muthén & Muthén, 2017). The items on negative experiences, affective styles, and cyberbullying were non-normally distributed ordinal variables with less than five response categories. Therefore, polychoric correlations instead of Pearson correlations were computed for these items (Barendse, Oort, & Timmerman, 2015; Flora & Curran, 2004). Furthermore, we calculated ordinal alphas as reliability

coefficients (Gadermann, Guhn, & Zumbo, 2012) for these scales using FACTOR (Lorenzo-Seva & Ferrando, 2006). For the CFAs of affective styles and cyberbullying, the robust weighted least squares (WLSMV) estimator was used (Barendse et al., 2015; Finney & Distefano, 2013; Flora & Curran, 2004). The emotion items were treated as continuous variables as they had more than five response categories (Finney & Distefano, 2013).

The CFA- and SEM-models were evaluated using model fit indices: chi-square (χ^2), root mean square error of approximation (RMSEA), comparative fit index (CFI), and Tucker-Lewis index (TLI) (Hooper, Coughlan, & Mullen, 2008; Hu & Bentler, 1999). An insignificant value of the χ^2 indicates a good model fit, but the χ^2 is very sensitive to sample size and will often reject the model with large sample sizes (as is the case here). For the other indices, values $< .08$ for RMSEA and $\geq .95$ for CFI and TLI indicate a good model fit (Hooper et al., 2008).

MISSING DATA

Of the 2,168 adolescents who participated in at least one wave, 1,157 (53.4%) participated in all three waves, 575 (26.5%) participated in two waves, and 436 (20.1%) only participated once². Of the wave 1-participants, 320 dropped out in wave 2, whereas 345 new students entered the study in wave 2. Between wave 1 and wave 2, several students dropped out because they had to repeat their grade or because they changed schools. In wave 3, 578 wave 1- and/or wave 2-participants dropped-out, whereas 102 new students entered the study.

Participants who participated in all waves were more often female (57% versus 51%) and were slightly younger (0.15 years on average) than participants who participated in one or two waves. They were also less often in the vocational education track than those who did not participate in all waves, which may (partly) be a consequence of the higher number of entire non-participating vocational education classes due to issues during data collection.

To maximize the power of our study and to retain as much data as possible, all participants – whether they participated in one, two, or three waves – were included in analyses. Full information maximum likelihood estimation (FIML) was used to handle missing data, so as to include all available observations and avoid generalizability issues that could result from using only the participants with complete data. The use of FIML to handle missing data has

been consistently recommended, especially when the amount of missing data is moderate to large (Newman, 2003; Widaman, 2006). When missingness is related to MAR mechanisms (as we propose is the case here), there appears to be no important bias in model estimation even when attrition is as high as 60% (Kristman, Manno, & Côté, 2005). Furthermore, it has been shown that estimates of associations between variables are generally not affected by attrition rate, even when more than 50% of the sample drops out (Gustavson, von Soest, Karevold, & Røysamb, 2012).

MEASUREMENT MODELS AND MEASUREMENT INVARIANCE

Participants completed the scales in each wave of data collection. To be able to compare their answers on these scales over time, longitudinal measurement invariance must hold (Widaman, Ferrer, & Conger, 2010). To test for longitudinal measurement invariance, a procedure of testing successively more restrictive models was followed (see Appendix).

STRUCTURAL MODEL

After establishing (partial) measurement invariance of all concepts, we constructed the hypothesized moderated mediation model. Because we wanted to predict changes (increases or decreases) in cyberbullying victimization related to earlier experienced events, related emotions, and affective styles, we used data on events, emotions, and affective styles from one time point to predict cybervictimization six months later, controlling for earlier cybervictimization (see Figure 2). For the measurement of events and emotions, participants were asked about their experiences in the past month. With regard to cybervictimization, participants were asked about their cyberbullying experiences in the past six months. There was a time gap of six months between each wave and (past month's) emotions experienced at the later waves might have little relation to the (past month's) events that happened at the previous wave of measurement, six months earlier. Because adolescents answered the questions about their emotions after they had answered the questions on events, the reported emotions were likely linked to the experienced events in that month (i.e., reported in the same wave). Unfortunately though, because we assessed the association between events and emotions at the same time point, no firm temporal or causal conclusions on the association can be drawn, as technically they are measured cross-

sectionally. For cybervictimization, the participants were asked about their experiences in the past six months, so this period extended right up to the previous wave, lending credibility to predictive power of events and emotions of the previous wave for later cybervictimization.

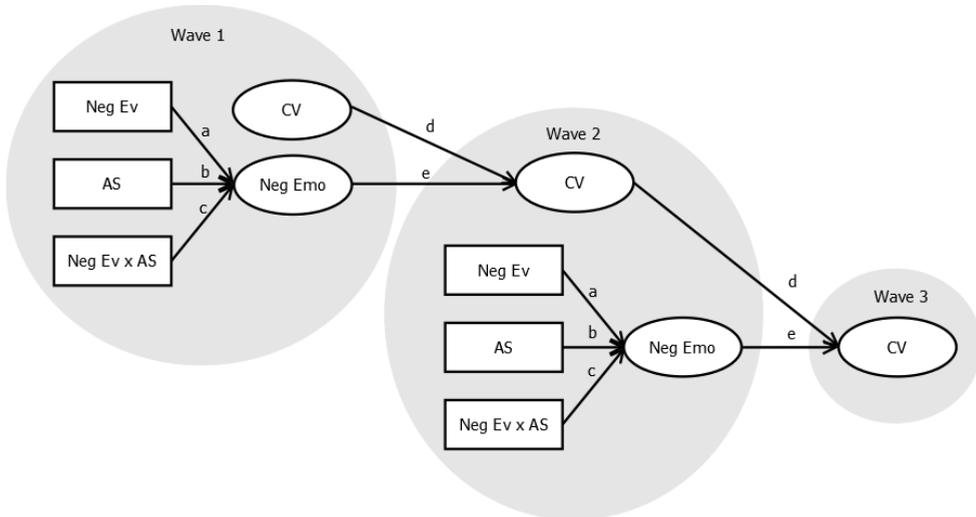


Figure 2. Structural model of moderated mediation; Neg Ev = negative events; AS = affective styles; CV = cyberbullying victimization; Neg Emo = negative emotions. Ellipses represent latent variables, rectangles represent manifest variables. Small caps letters indicate paths that are constrained to be equal across time. For clarity, the three subscales of affective styles (concealing, adjusting, and tolerating) are not shown, but these were entered as separate factors.

The data were collected in three measurement waves, therefore we constructed path models from wave 1 to wave 2 and from wave 2 to wave 3. Earlier cybervictimization was controlled for so that the parameter estimates of the regression coefficients of the variables of interest (negative events, negative emotions, and affective styles) would reflect the effect of these variables on the increase or decrease in later cyberbullying victimization. Equality constraints were imposed on the factor loadings and intercepts or thresholds as discussed above to account for measurement invariance. The path coefficients were also constrained to be equal across time (a model without these constraints did not fit significantly better than the constrained model: χ^2 -difference test ($df = 10$) = 9.289, $p = .505$, $\Delta CFI = .002$).

Computational problems arose when we estimated a structural equation model with latent factor interactions between events and affective styles. Therefore, we had to rely on manifest variables (mean scores) to test the moderation effect. For events, an average score for negative achievement-related (school, work, and health and physical appearance) and negative interpersonal (family, friendship, and peer-related and extracurricular activities) events was calculated. Then these two scores were averaged to compute a composite score of negative experiences. For affective styles, mean scores were computed for each subscale (*Concealing*, *Adjusting*, and *Tolerating*). After grand-mean centering, interaction effects of these variables were computed by multiplying the negative experiences score with each of the affective styles scores.

RESULTS

DESCRIPTIVE STATISTICS

Table 1 displays the variable ranges, means, standard deviations, and reliability coefficients.

Table 1
Descriptive Statistics of the Main Variables

Variable	Range	Wave 1			Wave 2			Wave 3		
		<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α	<i>M</i>	<i>SD</i>	α
NEv	[1-4]	1.542	0.302	0.857	1.525	0.293	0.880	1.528	0.307	0.898
NEm	[1-7]	2.584	0.972	0.692	2.631	1.013	0.723	2.733	1.040	0.724
AS										
Con	[1-5]	2.750	0.905	0.839	2.811	0.866	0.842	2.806	0.892	0.867
Adj	[1-5]	3.109	1.021	0.890	3.058	0.960	0.883	3.006	0.951	0.882
Tol	[1-5]	3.058	1.019	-	3.083	0.998	-	3.112	0.985	-
CV	[1-5]	1.222	0.355	0.931	1.205	0.342	0.943	1.248	0.382	0.942

Note. *M* = mean, *SD* = standard deviation, α = reliability coefficient (Cronbach's alpha for negative emotions, ordinal alpha for all other variables), NEv = negative events, NEm = negative emotions, AS = affective styles, Con = concealing, Adj = adjusting, Tol = tolerating, CV = cyberbullying victimization. The reliability coefficient for tolerating was not computed because this scale consists of only two items.

STRUCTURAL EQUATION MODELING

To test whether the experience of negative emotions, precipitated by negative events, leads to cyberbullying victimization, and whether this process is moderated by affective styles, moderated mediation structural equation modeling was used (see Figure 2). The model had

an acceptable fit to the data: χ^2 (df = 1244) = 3224.547, $p < .001$, RMSEA = .027, CFI = .934, TLI = .930, $R_{CV\ wave2}^2 = .472$, $R_{CV\ wave3}^2 = .364$. Table 2 displays the direct path coefficients.

Table 2

Direct Path Coefficients of the SEM-model of Negative Events, Negative Emotions, Affective Styles, and Cyberbullying Victimization

Path	<i>b</i>	<i>SE</i>	<i>p</i>	<i>b</i> * ^a	<i>b</i> * ^b
Negative emotions					
Negative events	1.898	0.093	< .001	0.651	0.595
Concealing	0.193	0.022	< .001	0.211	0.187
Adjusting	-0.536	0.027	< .001	-0.616	-0.536
Tolerating	0.260	0.019	< .001	0.315	0.288
Negative events x concealing	-0.070	0.036	.050	-0.025	-0.022
Negative events x adjusting	0.033	0.043	.431	0.014	0.011
Negative events x tolerating	-0.078	0.030	.009	-0.032	-0.028
Cyberbullying victimization (w_{i+1})					
Negative events	0.972	0.181	< .001	0.175	0.155
Negative emotions	0.188	0.065	.004	0.098	0.096
Cyberbullying victimization	0.515	0.030	< .001	0.512	0.462

Note. *b* = unstandardized path coefficient, *SE* = standard error, *b** = standardized path coefficient. All variable labels refer to the first point of measurement (wave 1 for the wave 1-2-paths and wave 2 for the wave 2-3-paths), except for cyberbullying victimization w_{i+1} , which refers to the second point of measurement (wave 2 for the wave 1-2-paths and wave 3 for the wave 2-3-paths). Significant ($p < .05$) path coefficients are in bold.

^a Standardized path coefficients of wave 1-2-paths.

^b Standardized path coefficients of wave 2-3-paths.

Firstly, as predicted by hypothesis 1, negative experiences were related to negative emotions, and the experience of negative emotions predicted a later increase in cyberbullying victimization. The direct association of negative events with later cyberbullying victimization was also significant.

To examine whether there was a mediation effect of negative events on later cyberbullying victimization via negative emotions, we conducted a bootstrap analysis with 1000 bootstrap draws (Zhao, Lynch Jr., & Chen, 2010). Table 3 displays the parameter coefficients of the total, indirect, and direct effects and the 95% confidence intervals around these coefficients using bias corrected bootstrap standard errors. A confidence interval that does not include zero indicates a significant effect. As can be seen in Table 3, all the effects were significant.

Table 3

Unstandardized and Standardized Total, Indirect and Direct Effects of Negative Events via Negative Emotions on Cyberbullying Victimization, With 95% Confidence Intervals Using Bias Corrected Bootstrap Standard Errors Obtained After 1000 Bootstraps

Effect	Unstandardized		Standardized, W1-W2		Standardized, W2-W3	
	<i>b</i>	95% CI (<i>b</i>)	<i>b</i> *	95% CI (<i>b</i> *)	<i>b</i> *	95% CI (<i>b</i> *)
Total	1.328	[0.865, 1.757]	0.239	[0.168, 0.302]	0.212	[0.140, 0.269]
Indirect	0.356	[0.014, 0.663]	0.064	[0.003, 0.119]	0.057	[0.002, 0.103]
Direct	0.972	[0.408, 1.594]	0.175	[0.078, 0.283]	0.155	[0.056, 0.242]

Note. *b* = unstandardized coefficient, *b** = standardized coefficient, CI = confidence interval. Because the paths were constrained to be equal across time, the unstandardized path coefficients were equal for wave 1-2 and wave 2-3.

As expected (H1), there was a significant indirect association of negative events with later cybervictimization via the experience of negative emotions. However, the direct path from negative events to cybervictimization was also significant, even when accounting for the indirect effect via negative emotions. This type of mediation is called complementary mediation and signifies the possible existence of another omitted mediator variable in the relationship between negative events and cybervictimization (Zhao et al., 2010).

Further, as expected affective styles were also consistently related to negative emotions: concealing related positively and adjusting negatively to experiencing negative emotions. Contrary to our expectations, tolerating was also positively related to the experience of negative emotions. In other words, adolescents who often concealed or tolerated their emotions, or did not often use adjusting strategies reported more negative emotions.

Furthermore, the association between negative events and emotions was moderated negatively by tolerating and by concealing (borderline significant at $p = .050$). Examination of the interaction plots (see Figure 3 and 4) shows that the moderating effects of concealing and tolerating affective styles on the association between negative events and emotions are most pronounced at low levels of negative events, where the threshold to experience negative emotions related to negative events is substantially lower for adolescents who habitually conceal or tolerate their emotions. When the number of negative experienced events increases, the differences in affective styles between adolescents decreasingly play a role in the association between negative events and negative emotions. Thus, it seems as if high levels of concealing or tolerating had a small exacerbating effect on the experience

of negative emotions associated with negative experiences, but this effect diminished when adolescents experienced more negative experiences.

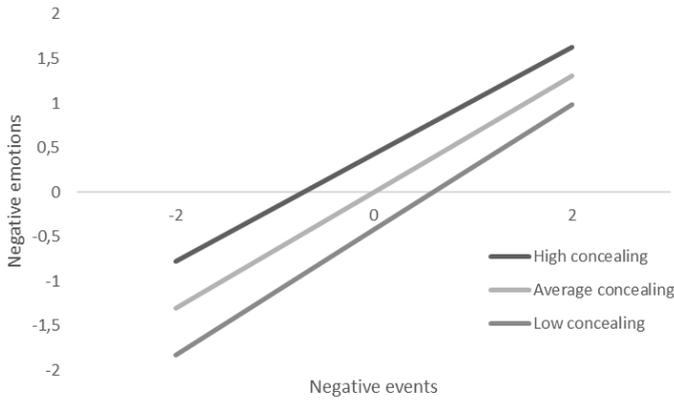


Figure 3. Interaction effect of negative events with concealing on negative emotions (standardized variables). High = 2 standard deviations above the mean; low = 2 standard deviations below the mean.

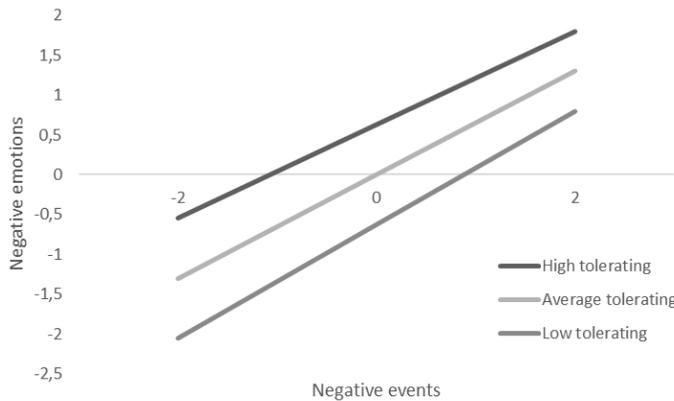


Figure 4. Interaction effect of negative events with tolerating on negative emotions (standardized variables). High = 2 standard deviations above the mean; low = 2 standard deviations below the mean.

DISCUSSION

Research on cyberbullying has yielded important insights into the antecedents and consequences of this phenomenon (e.g., Kowalski et al., 2014). Personal and contextual risk factors that increase the risk of involvement in cyberbullying are being identified (e.g., Guo, 2016), but the interplay between these factors has seldom been addressed. Therefore, the

aim of this study was to examine how the interplay of adolescents' experiences of negative events (contextual factors), negative emotions, and affective styles (personal factors) influences their involvement in cyberbullying as victims. Using structural equation models, the present study examined a moderated mediation model in which adolescents' experiences of negative events, moderated by affective styles, predicted cyberbullying victimization via the experience of negative emotions. This model was tested longitudinally on data from three waves of data collection.

Overall, we found support for our model, with direct effects of negative events and affective styles on negative emotions, as well as direct and indirect effects of negative events and emotions on cyberbullying victimization. We also found partial support for moderation effects of affective styles on the association between negative events and emotions.

Firstly, as expected and in line with previous research, negative events were consistently related to negative emotions. Further, adolescents' habitual tendencies to use particular emotion regulation strategies (affective styles) were also consistently linked with negative emotions: concealing and tolerating were positively, and adjusting negatively related to negative emotions. Trying to conceal or suppress emotions has been shown previously to lead to an increase in negative emotions, whereas reappraisal (closely related to adjusting) decreases the experience of negative emotions (Campbell-Sills et al., 2006; Gross & John, 2003). Contrary to previous findings, however, tolerating was also positively related to experiencing negative emotions. In other words, adolescents who had the tendency to have a tolerating and accepting attitude towards their emotions experienced more negative emotions. Although this was not as expected, it is plausible that accepting and tolerating your negative emotions leads to an increase in the experience of these emotions, as by accepting them, these emotions are allowed to be experienced instead of avoided or moderated. Alternatively, it could be that the Tolerating subscale, which in this study consisted of the items "It's ok if people see me being upset" and "It's ok to feel negative emotions at times", tapped into adolescents' attitudes or perceived social norms towards experiencing negative emotions. In that case, a higher score on Tolerating would indicate a more positive attitude towards experiencing negative emotions, which might be associated

with less hesitance to admit experiencing these emotions, which could explain the higher reported experience thereof.

Further, there were two moderation effects of affective styles on the association between negative events and emotions. The association between negative events and the experience of negative emotions was exacerbated when adolescents habitually concealed or tolerated their emotions, especially at low levels of negative events. With an increasing number of negative events reported, the differences among adolescents who habitually concealed or tolerated their emotions at different degrees became smaller. Stated differently, adolescents' emotional reactions to negative events, related to their affective styles, differed the most when they encountered few negative events. When adolescents experienced few negative events, adolescents who habitually suppressed or tolerated their emotions were more vulnerable to experience negative emotions. As the number of negative events increased, this vulnerability factor became less influential. Hence, our findings suggest that when adolescents experience many negative events, how they regulate their emotions becomes less important in the effect on their experience of negative emotions. This finding is surprising, as previous studies have found that emotion regulation strategies generally have a higher impact on affective reactions when stress increases (Boyes, Hasking, & Martin, 2016; Extremera & Rey, 2015; Flouri & Mavroveli, 2013; Richardson, 2017; Troy & Mauss, 2011). Perhaps there is a curvilinear relationship in which emotion regulation tendencies are generally helpful in dealing with negative events, but this effect disappears at very high levels of negative events, when the stress is too high and the negative impact too large for affective styles to be able to buffer the effect on negative emotions. Further research should be undertaken to explore this negative moderation effect in more depth.

The results of this study further indicate that negative events predict later cybervictimization and that this link is partially mediated via the experience of negative emotions. This finding connects personal with contextual risk factors in predicting cyberbullying involvement, while confirming previous research on the effects of peer, family, and school events and negative emotions on cyberbullying involvement (e.g., Guo, 2016). It suggests that experiencing negative events in several domains can increase the risk

of cyberbullying victimization via the experience of negative emotions as a reaction to these events.

Whereas previous studies on the association between cybervictimization and emotions used cross-sectional data or examined the impact of being a victim of cyberbullying on emotions (Ortega et al., 2012; Sjørsø et al., 2014; Spears, Slee, Owens, & Johnson, 2009), this study shows that negative emotions also *predict* later cybervictimization. Perhaps the experience and expression of negative emotions, especially fear and sadness, makes adolescents easy targets of cyberbullying, as they can appear to be weak and vulnerable when displaying these emotions. Alternatively, the experience of negative emotions may motivate adolescents to engage in risky online behavior as a way to cope with these aversive feelings (Cooper, Agocha, & Sheldon, 2000), making adolescents more vulnerable to become a target of cyberbullying. Indeed, research has found that cybervictims more often engage in risky usage of digital technologies, such as disclosing personal information online (Erdur-Baker, 2010; Peluchette, Karl, Wood, & Williams, 2015).

On the positive side, when adolescents do not experience negative feelings even though they experienced negative events, perhaps because they use adaptive affective styles such as adjusting, they may not have an increased risk of becoming involved in cyberbullying. This finding is important for intervention strategies, as it suggests that interventions could benefit from teaching adolescents how to adequately cope with negative events and emotions.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

The findings of this study have to be interpreted in light of some limitations. Firstly, although we had longitudinal data from three waves, the time interval between these waves was too long to examine the moderated mediation model with data from all three waves. Ideally, the model should be evaluated using responses on events and affective styles at one time point, emotions at a second time point a little later, and cyberbullying involvement at a third (considerably later) time point. However, the time lag of six months between two waves in the present study was too large for the emotions to be contingent on the events of the previous wave. Therefore, we chose to opt for a model in which the data from all the waves

were used with paths from wave 1 to wave 2 and from wave 2 to wave 3, so as to retain the maximum amount of information from the data and power for analysis. Future research using more appropriate time lags between events and emotions (for example, one week), could provide a more stringent test of the model.

Secondly, the Affective Style Questionnaire (Hofmann & Kashdan, 2010) has not been used in our population before the start of the study. Unfortunately, we could not replicate the factor structure of the original scale, and several items did not function well in our sample. Further, pupils did not understand the meaning of some items. Therefore, we had to drop items to obtain a simple factor structure that replicated the original factor structure and subscales. This increased the reliability of the Adjusting and Concealing subscale, but only two items remained for the Tolerating subscale. The scale modification and shortening may have altered the scale so that it did not fully capture the essence of the original scale any more. This could also be part of the reason why analyses with the Tolerating subscale produced different results than expected. Nevertheless, we believe that this scale modification procedure was necessary to obtain coherent and reliable subscales in our sample. Future research could consider the use of another scale to measure affective styles. Additionally, future studies could assess situation-specific emotion regulation strategies and their role in the association between negative emotions and cybervictimization.

Thirdly, students were grouped within classes and classes were grouped within schools, yielding a three-level data structure. Multilevel analyses are most suited to analyze such nested data. However, we already encountered computational problems when we tried to analyze the latent moderated mediation model in Mplus, and adding the multilevel structure to this analysis increased model complexity even further. Moreover, the students changed classes (and sometimes schools) between the waves, complicating the nested structure even more. Therefore, unfortunately, we could not take the multilevel nature of the data into account in the analyses. Fortunately though, methods and statistical programs to analyze multilevel structural equation models are developing rapidly, so we hope that future studies will succeed in analyzing latent moderated mediation models with longitudinal multilevel data.

Fourthly, the generalizability of these results is subject to certain limitations. Although the study sample is representative of its population, namely 13- to 14-year-old Flemish adolescents, the results might be different in other populations (older or younger, from different cultures). Future research could examine whether the current findings also hold in older or younger samples and samples from other cultural backgrounds.

Finally, our mediation analysis yielded evidence for complementary mediation (both the direct effect and the mediated effect of negative events on cybervictimization exist and point at the same direction). According to Zhao et al. (2010), this suggests the possible existence of a second, omitted mediator in the path from negative events to cybervictimization. To develop a full picture of the process from negative events to cybervictimization, future studies could explore other possible mediators, such as behavioral reactions (e.g., withdrawal) or maladaptive coping strategies. Moreover, the association between negative emotions and cybervictimization may also be mediated and moderated by variables not included in the present study. Future research could examine possible variables underlying this association, such as situation-specific emotion regulation strategies or social sharing tendencies.

IMPLICATIONS FOR PRACTICE

This study shows that what adolescents experience in daily life and how they emotionally react to those experiences influences their involvement in cyberbullying as victims. This has important implications for cyberbullying prevention and intervention. On the one hand, negative events in the peer, family, and school domain seem to increase the risk of cyberbullying victimization. Cyberbullying prevention and intervention programs could therefore benefit from taking adolescents' context into account: how do the adolescents function at school, home, and with peers? Are they stressed by negative events in their daily lives? And if so, what can be done to minimize exposure to these negative events? As negative events can happen in several domains, it is important to conduct a detailed analysis of the origin of stress and to work together with school personnel, family members, and fellow students to decrease negative experiences in adolescents' lives.

On the other hand, not all negative experiences can or should be avoided. Negative events often bring about negative emotions, and it seems that some adolescents become easy targets of cyberbullying when they experience many negative emotions. These adolescents may benefit from learning adaptive strategies to deal with negative experiences and emotions. As previous research has shown that the repertoire of adaptive emotion regulation strategies is smallest in middle adolescence (Zimmermann & Iwanski, 2014), this age group may benefit most from trainings on how to adaptively cope with negative events and emotions, and this may decrease their likelihood to become a cybervictim.

Cyberbullying intervention programs may also help building adolescents' online resilience by exploring and discussing adaptive ways of social sharing of emotions. Computer-mediated social sharing of emotions can increase positive as well as negative affect (Choi & Toma, 2014). Online interactions may increase perceived social support and thereby decrease depressive feelings; however, online interactions may also stimulate co-rumination ("extensively discussing and revisiting problems, speculating about problems, and focusing on negative feelings," Rose, 2002, p. 1830), resulting in increased depressed mood (Frison, Bastin, Bijttebier, & Eggermont, submitted). Research with older adolescents (14-18 years old) has shown that most of the time, they seem to make conscious decisions about if, how, through which communication mode, and with whom they share their emotions online and offline (Vermeulen, Vandebosch, & Heirman, 2017). This is important because when people want to receive social support online, they have to keep the norms of appropriate online social sharing in mind when expressing their needs for emotional comfort (Buehler, 2017; Waterloo, Baumgartner, Peter, & Valkenburg, 2017). However, younger adolescents might need more guidance to understand the negative effects of co-rumination online and to learn the norms of acceptable online sharing of emotions on different platforms.

CONCLUSION

The use of digital technologies is part of daily life for most adolescents in developed countries, providing them with many opportunities to explore, develop their identities and connect to others, but also with risks such as cyberbullying (Livingstone, Haddon, Görzig, & Ólafsson, 2011). Cyberbullying victimization is associated with several risk factors, related

to the individual as well as to his or her context (e.g., Guo, 2016). The findings of the present study add to the cyberbullying research by providing support for the interplay between individual and contextual factors in cybervictimization. In particular, our findings show that adolescents' experience of negative events and their negative emotional reactions to these events may make them vulnerable for cybervictimization.

These findings have important implications for practice and future research. Prevention and intervention strategies could benefit from taking the daily hassles of adolescents involved in cyberbullying into account and from teaching adolescents how to adaptively cope with negative events and regulate their emotions. Future research could examine more closely which specific types of events (e.g., peer-related, school stressors, family problems) are most likely to have an effect on cyberbullying victimization and which coping and emotion regulation strategies are most suited to buffer the effect of negative events and emotions on cybervictimization.

NOTES

¹ Participants were nested within classes and classes within schools, which calls for a multilevel analytic strategy. However, due to some participants changing classes or schools between the data collection waves, it was not possible to carry out multilevel analysis.

² It must be noted that drop-out and new enrolment could in some cases also be the result of an inability to correctly link students' questionnaires to each other, based on incomplete or incorrect linking data.

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APPENDIX

MEASUREMENT INVARIANCE TESTS

For the measure of negative events and emotions, we followed the steps outlined by van de Schoot, Lugtig, and Hox (2012). The items of these scales are (continuous) item parcels based on mean scales for negative events, or ordinal variables with more than five response categories for negative emotions, and therefore we treated them as continuous (Finney & Distefano, 2013). We used maximum likelihood estimation with robust standard errors (MLR) to control for non-normality of the data. For the measures of affective styles and cyberbullying, we followed the procedure for ordinal Likert-type scales described by Coertjens, Donche, De Maeyer, Vantournhout, and Van Petegem (2012).

To test for measurement invariance with continuous indicators, the series of successively more restrictive models consists of (1) a configural invariance (or baseline) model (with covariances between residuals of equivalent items across waves), (2) a metric invariance model (adding invariant factor loadings across waves), and (3) a scalar invariance model (adding invariant intercepts) (van de Schoot et al., 2012). To test for measurement invariance with ordinal indicators, the series of models consists of (1) a configural invariance (or baseline) model, followed by (2) an invariant factor loadings model, and (3) a model with invariant factor loadings and invariant item thresholds (Coertjens et al., 2012). Models are compared using the relative change in the comparative fit index (Δ CFI), where a value equal to or greater than $|.01|$ indicates that the more restrictive model fits the data less well than the less restrictive model (Cheung & Rensvold, 2002). More restrictive models provide stronger evidence for measurement equivalence, but full equivalence is not necessary to make valid inferences across time, as long as at least two loadings and intercepts are equivalent over time (Byrne, Shavelson, & Muthén, 1989). If not all loadings or intercepts/thresholds are invariant across time, this is called partial measurement invariance.

For each scale, we first evaluated the measurement model in each wave separately. Then, we evaluated measurement invariance across waves.

NEGATIVE EVENTS

Following the steps by the authors of the scale (Shahar et al., 2003), first per life domain (family life, close friendships, peer relations and extracurricular activities, school, general performance, and health and appearance) the average of the three items was computed to create item parcels. Then, a second-order factor analysis with first-level factors for negative achievement-related (school, general performance, and health and appearance) and interpersonal events (family life, close friendships, peer relations and extracurricular activities) and a second-level factor for negative events was executed. We constrained the variances of the two first-order factors to equality for model identification purposes. Maximum likelihood estimation with robust standard errors (MLR) was used to control for non-normality of the data. The model fit statistics (except for the χ^2 , which is sensitive to large sample sizes) demonstrated that this measurement model had an acceptable fit in each wave: wave 1: $\chi^2 (df = 8) = 30.899, p < .001, RMSEA = .041, CFI = .977, TLI = .956$; wave 2: $\chi^2 (df = 8) = 51.163, p < .001, RMSEA = .056, CFI = .962, TLI = .930$; wave 3: $\chi^2 (df = 8) = 48.833, p < .001, RMSEA = .057, CFI = .966, TLI = .936$.

Longitudinal measurement invariance across the waves was evaluated by comparing a model of configural invariance ($RMSEA = .023, CFI = .978, TLI = .970$) with a metric invariance ($RMSEA = .022, CFI = .977, TLI = .972$), and a scalar invariance model ($RMSEA = .026, CFI = .967, TLI = .962$). Although the scalar invariance model had an excellent absolute fit to the data, the difference in CFI with the metric invariance model was equal to the critical value of .01 (Cheung & Rensvold, 2002) and therefore we could only establish partial scalar invariance ($RMSEA = .023, CFI = .974, TLI = .970$) by releasing one item intercept.

NEGATIVE EMOTIONS

A CFA in which the four negative emotions loaded on one factor, yielded an excellent fit in each wave: wave 1: $\chi^2 (df = 2) = 17.549, p < .001, RMSEA = .067, CFI = .982, TLI = .945$; wave 2: $\chi^2 (df = 2) = 2.324, p = .313, RMSEA = .010, CFI = 1.000, TLI = .999$; wave 3: $\chi^2 (df = 2) = 2.062, p = .357, RMSEA = .004, CFI = 1.000, TLI = 1.000$.

Longitudinal measurement invariance was evaluated by comparing a model of configural invariance ($RMSEA = .015, CFI = .996, TLI = .994$) with a metric invariance ($RMSEA = .014,$

CFI = .996, TLI = .994), and a scalar invariance model (RMSEA = .024, CFI = .986, TLI = .983). Although the scalar invariance model had an excellent absolute fit, Δ CFI with the metric invariance model was equal to the critical value of .01 (Cheung & Rensvold, 2002). By releasing one item intercept (wave 3 jealous), we established partial scalar invariance (RMSEA = .020, CFI = .91, TLI = .988).

AFFECTIVE STYLES

A CFA following the authors' proposed three-factor structure yielded an unacceptable fit in each wave (wave 1: χ^2 ($df = 167$) = 3992.361, $p < .001$, RMSEA = .120, CFI = .761, TLI = .728; wave 2: χ^2 ($df = 167$) = 6159.380, $p < .001$, RMSEA = .147, CFI = .658, TLI = .611; wave 3: χ^2 ($df = 167$) = 6232.499, $p < .001$, RMSEA = .153, CFI = .676, TLI = .631), with multiple items having low and insignificant factor loadings and modification indices suggesting several cross-loadings. Therefore, instead of making numerous post-hoc adjustments based on the modification indices, we ran separate EFAs for each wave and retained only those items that had a loading higher than 0.3 on their designated factor and no cross-loadings in each wave (Costello & Osborne, 2005). This resulted in five items for Concealing, four items for Adjusting and two items for Tolerating. A CFA with these items yielded a better fit to the data: wave 1: χ^2 ($df = 41$) = 514.566, $p < .001$, RMSEA = .086, CFI = .945, TLI = .927; wave 2: χ^2 ($df = 41$) = 501.668, $p < .001$, RMSEA = .082, CFI = .948, TLI = .930; wave 3: χ^2 ($df = 41$) = 454.091, $p < .001$, RMSEA = .081, CFI = .958, TLI = .944.

Next, we tested for longitudinal measurement invariance. The analysis revealed that longitudinal measurement invariance holds for this scale, as the model with invariant factor loadings and thresholds had a good fit (RMSEA = .038, CFI = .949, TLI = .949) and the Δ CFI for this model versus the configural model (RMSEA = .040, CFI = .953, TLI = .942; Δ CFI = -.004) and the invariant factor loadings model (RMSEA = .039, CFI = .954, TLI = .945; Δ CFI = -.005) did not exceed the critical value of .01 (Cheung & Rensvold, 2002). Thus, the measurement invariant model was used in further analysis.

CYBERBULLYING VICTIMIZATION

Model fit statistics of CFAs in which all items loaded on one factor demonstrated that the model fit the data reasonably in each wave, although the RMSEAs were quite high: wave 1:

$\chi^2 (df = 35) = 540.722, p < .001, RSMEA = .092, CFI = .932, TLI = .913$; wave 2: $\chi^2 (df = 35) = 569.094, p < .001, RSMEA = .094, CFI = .920, TLI = .897$; wave 3: $\chi^2 (df = 35) = 593.692, p < .001, RSMEA = .100, CFI = .954, TLI = .940$.

We then tested for longitudinal measurement invariance to ascertain that the measurement model was equivalent over time (Coertjens et al., 2012). The analysis revealed that longitudinal measurement invariance holds for this scale, as the model with invariant factor loadings and thresholds had a good fit (RMSEA = .034, CFI = .953, TLI = .957), and the ΔCFI for this model versus the configural model (RMSEA = .039, CFI = .951, TLI = .943; $\Delta CFI = -.002$) and the invariant factor loadings model (RMSEA = .037, CFI = .954, TLI = .948; $\Delta CFI = .001$) was not larger than the critical value of .01 (Cheung & Rensvold, 2002). Thus, the model with invariant factor loadings and thresholds was used in further analysis.

CHAPTER 7

PATTERNS OF CYBERVICTIMIZATION AND EMOTION REGULATION IN ADOLESCENTS AND ADULTS

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* These authors contributed equally to the work.

PATTERNS OF CYBERVICTIMIZATION AND EMOTION REGULATION IN ADOLESCENTS AND ADULTS

Abstract

Research on cyberbullying has boomed in the past two decades. Findings from studies among adolescents suggest that they can be classified into distinct groups based on their cyberbullying experience, and that cyberbullying seems to be related to poor emotion regulation. So far, only a few studies have examined cyberbullying among adult workers and it is unclear whether cyberbullying develops similarly in that population. Therefore, in this study cyberbullying victimization was assessed in adolescents and adult workers simultaneously to address three aims: (1) to explore which groups can be distinguished based on their cyberbullying experience, (2) to analyze the associations of group membership with the way people regulate their emotions, and (3) to examine whether the results are comparable in adolescents and adults. Latent class analysis was used to analyze data from 1,426 employees and 1,715 adolescents in the first year of secondary education (12-13 years old). In each population, three profiles differing in their patterns of cybervictimization were identified: no cybervictimization (80%), work-related cybervictimization (18%), and pervasive cybervictimization (3%) for adults, and no cybervictimization (68%), similar-to-offline cybervictimization (27%), and pervasive cybervictimization (4%) for adolescents. Furthermore, these profiles differed in their use of emotion regulation strategies, with pervasive cyber-victims suppressing their emotions significantly more than other groups. Future research is needed to clarify the role of emotion regulation in cyberbullying as an antecedent or consequent of victimization.

INTRODUCTION

The past decades have been characterized by a digital revolution. This has led to information communication technologies (ICT) becoming an inherent part of people's daily lives. The increasing shift of our daily reality from the physical to the online context has led to a transformation of interpersonal phenomena as well. In that respect, cyberbullying – defined as “an aggressive, intentional act carried out by a group or individual, using mobile phones or the internet, repeatedly and over time against a victim who cannot easily defend him or herself” (Smith et al., 2008) – has been gaining attention. However, while research into adolescent cyberbullying has boomed since the beginning of the 21st century, efforts to understand adult cyberbullying have been less pronounced (Zych, Ortega-Ruiz, & Del Rey, 2015). Yet, evidence indicates that cyberbullying is a prevalent phenomenon in working adults as well (D’Cruz & Noronha, 2013; Forssell, 2016; Privitera & Campbell, 2009). Moreover, there is a dearth of research examining cyberbullying in both populations simultaneously, and it is unclear whether cyberbullying victimization is related to similar factors in children and adults.

Adolescents and adults differ markedly, not only in age but also in life experience, exposure to ICT, context, etc. Therefore, the first question of this study is whether cyberbullying victimization manifests itself similarly in these two populations or whether the nature of cyberbullying changes throughout the lifespan. This is relevant, as it can help us understand whether lines can be drawn between different age groups in this phenomenon or whether cyberbullying fundamentally changes over the lifecourse. Because of this, we investigate whether different groups of adolescents and adults can be distinguished based on their exposure to cyberbullying acts. The second question pertains to whether similar factors relate to adolescent and adult cyberbullying. If similar factors are found to be associated with cyberbullying in different age groups, this would lend particularly strong support for their importance in the cyberbullying process. While many different variables have been associated with cyberbullying victimization in adolescents, not all of these variables are expected to be equally relevant in adulthood. In this study we focus on the association between cyberbullying and emotion regulation. Emotion regulation has previously been linked with cyberbullying in the school context (Hemphill & Heerde, 2014; Hemphill, Tollit,

Kotevski, & Heerde, 2015). Moreover, emotion regulation seems to play a uniquely important role for cyberbullying. Namely, evidence indicates that adolescents experiencing social and emotional difficulties are more likely to be cyberbullied and traditionally bullied, than traditionally bullied only (Cross, Lester, & Barnes, 2015). Furthermore, not being able to use one's own emotions in social interactions is a predictor of cyberbullying but not traditional bullying (Baroncelli & Ciucci, 2014). Finally, emotion regulation is a factor that remains important for individuals' social functioning irrespective of their age or context (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Diamond & Aspinwall, 2003). This is why in this study we additionally investigate whether emotion regulation strategies are associated with different cyberbullying victimization patterns in adolescents and adults.

CYBERBULLYING VICTIMIZATION: DIFFERENCES IN EXPERIENCE

The majority of cyberbullying research has focused on children and adolescents, because many of them are confronted with this type of behavior during their school years (e.g., Tsitsika et al., 2015). In cyberbullying studies, individuals are often either considered to be victimized or not, based on their response to one or more questions on cyberbullying victimization experiences (Thomas, Connor, & Scott, 2015). However, the group of victims is highly heterogeneous, with victimization experiences ranging in type, frequency, and severity (Smokowski, Evans, & Cotter, 2014; Staude-Müller, Hansen, & Voss, 2012).

Identifying subgroups in cyberbullying victimization can be useful for understanding individual differences in adjustment and well-being (e.g., Schwartz, 2000). The fact that negative experiences can differ so profoundly is significant as it influences the prevention and remediation strategies applied. As such, identifying subgroups may help in developing tailored interventions: Interventions that are adjusted to the specific cyberbullying features individuals experience may be more effective in preventing bullying than standard interventions (Nocentini, Zambuto, & Menesini, 2015; Ryan & Lauer, 2002). It is therefore important to examine whether individuals who experience cyberbullying can be classified according to their victimization patterns.

To analyze whether subgroups of individuals can be distinguished based on similar patterns of cyberbullying experiences, person-centered approaches such as latent-class analysis can

be used. In previous attempts to distinguish different groups of adolescents based on their involvement in cyberbullying, the relation between online victimization and perpetration has been examined (Festl, Vogelgesang, Scharnow, & Quandt, 2017; Schultze-Krumbholz et al., 2015), as well as the stability of cyberbullying victimization over time (Gómez-Guadix, Gini, & Calvete, 2015), and the relation between online and offline bullying behavior (Pabian & Vandebosch, 2016; Wang, Iannotti, & Luk, 2012; Wang, Iannotti, Luk, & Nansel, 2010). However, subgroups based (solely) on cyberbullying victimization experiences have not been examined yet.

Recently, cyberbullying researchers have begun to examine cyberbullying in other populations, and a few studies have indicated that cyberbullying also occurs in the workplace (e.g., Coyne et al., 2016; Gardner et al., 2016). Workplace cyberbullying has been defined as “all negative behavior stemming from the work context and occurring through the use of ICTs, which is either (a) carried out repeatedly and over a period of time or (b) conducted at least once but forms an intrusion into someone’s private life, (potentially) exposing it to a wide online audience. This behavior leaves the target feeling helpless and unable to defend” (Vranjes, Baillien, Vandebosch, Erreygers, & De Witte, 2017, p. 326). Until now, no attempts have been made to examine whether subgroups of individuals can be distinguished based on their involvement in cyberbullying behavior at work. However, in a study among Belgian employees (Notelaers, Einarsen, De Witte, & Vermunt, 2006), six latent classes of traditionally bullied employees were identified: “not bullied,” “limited work criticism,” “limited negative encounters,” “sometimes bullied,” “work related bullied,” and “victims”. Similar groups were also found in a later study among Spanish employees by Leon-Perez, Notelaers, Arenas, Munduate, and Medina (2014).

Research has shown that the culture of the organization in which individuals are embedded (school or workplace) has an important influence on bullying behavior: Bullying is more prevalent in non-democratic and authoritarian organizations with a rigid hierarchy (Leymann, 1996; Roland & Galloway, 2002), and the presence or absence of explicit rules against bullying, implicit rewards for bullying (e.g., increased status), and organizational responses to bullying also play an important role (Monks et al., 2009). We might expect that adults experience more indirect and subtle, less obvious forms of cyberbullying, as there

may be severe consequences to being identified as a bully in the workplace, such as being fired (Monks et al., 2009; Smith, Singer, Hoel, & Cooper, 2003). Additionally, we might expect less "traceable" forms of cyberbullying, such as text-or image-based cyberbullying, as these could be used as evidence against the perpetrator in disciplinary actions (Ariss, 2002).

CYBERBULLYING AND EMOTION REGULATION

Emotions have an important function as they order the behavior of people and help them position themselves in society (Cole, Martin, & Dennis, 2004). Additionally, experienced and expressed emotions are also a signal for others around on how to behave (Van Kleef, 2009). The way emotions are managed can therefore be of crucial importance in social interactions. The strategies individuals use to regulate their internal emotional arousal are defined as emotion regulation (Gross & Thompson, 2007).

According to the process model of emotion regulation, two broad categories of emotion regulation can be distinguished: antecedent-focused and response-focused (Gross, 1998a, 1998b). Antecedent-focused strategies alter the experience of emotions resulting from specific stimuli. Response focused strategies alter the emotional expression of the experienced emotions. In that regard, reappraisal (i.e., reinterpretation of the meaning of an emotion-eliciting event) and suppression (i.e., inhibition of emotion expression) are said to be the two most commonly used antecedent-focused and response-focused emotion regulation strategies respectively (John & Gross, 2004).

Difficulty managing and regulating emotional expression has been shown to be an important predictor of problematic peer relationships in children (Pakaslahti, 2000). Adolescent victims of traditional bullying display higher scores on emotion dysregulation than non-victims (Garner & Hinton, 2010; Schwartz, 2000; Spence, De Young, Toon, & Bond, 2009). Furthermore, when victims of bullying fail to adaptively regulate their emotions, this can provoke continuation of victimization (Cowie & Berdondini, 2002; Spence et al., 2009). With regards to cyberbullying, adolescent cyberbullying perpetrators seem to be less able to regulate and use their emotions than non-involved adolescents and traditional bullies (Baroncelli & Ciucci, 2014). They also make more use of negative emotion regulation

strategies, such as self- or other-blaming, ruminating, and catastrophizing, to cope with anger (den Hamer & Konijn, 2016). Victims of cyberbullying also seem to show deficits in emotion regulation: Adolescents who are less skilled in controlling their emotions are at higher risk of cybervictimization (Hemphill & Heerde, 2014; Hemphill et al., 2015) and being victimized online increases later rumination (Feinstein, Bhatia, & Davila, 2014).

In adults, empirical evidence on the factors related to cyberbullying is scarce. However, recently, a theoretical model has been developed putting emotions and emotions regulation strategies forward as crucial factors in the cyberbullying process in the workplace (Vranjes et al., 2017). Emotion regulation difficulties may either be a risk factor for cyberbullying or a response to being cyberbullied, or both. Given that individuals who suppress their emotions tend to come across as less authentic and are therefore less likely to get social support (English & John, 2013), it could be that these individuals are easy victims for online aggression. However, it could also be that suppression is a strategy used by cyberbullying victims to cope with their negative emotions. In that regard, it has already been demonstrated that victims of cyberbullying often apply emotion-focused coping strategies (Raskauskas & Huynh, 2015) and that responses to cyberbullying are generally passive (Hamm et al., 2015).

In this paper, we also focus on the emotion regulation strategies of reappraisal and suppression, given that they are the most widely used regulatory strategies with a clear link to different individual outcomes (John & Gross, 2004). We know that these strategies are applied by both adolescents and adults, although to a different extent – adolescents tend to use somewhat less reappraisal (Garnefski, Legerstee, Kraaij, van den Kommer, & Teerds, 2002) and more suppression (Gullone, Hughes, King, & Tonge, 2010) in comparison to older age groups. However, there is an abundance of evidence that in both adolescents and adults, reappraisal is linked to beneficial outcomes (Carthy, Horesh, Apter, Edge, & Gross, 2010; Garnefski, Koopman, Kraaij, & ten Cate, 2009; J. J. Gross & John, 2003; Richards & Gross, 2000), such as higher well-being and less anxiety, while suppression is linked to harmful outcomes, such as more depression, anxiety and aggressive behavior, and less positive mood (Betts, Gullone, & Allen, 2009; Butler et al., 2003; J. J. Gross, 2002; Jaffe, Gullone, & Hughes, 2010; Zeman, Shipman, & Suveg, 2002). We therefore expect

reappraisal to be associated with less exposure to cyberbullying, and suppression with more exposure to cyberbullying, in both adolescents and adults.

THIS STUDY

In this study, comparing an adolescent and an adult sample, we aim to examine whether different subgroups of individuals can be identified based on their cyberbullying victimization experiences. Because the two populations differ markedly, it is interesting to explore whether comparable subgroups exist among adolescents and adults. Additionally, we aim to investigate the association between reappraisal and suppression emotion regulation strategies and group membership based on cyberbullying victimization experiences in both populations.

METHOD

The data were collected in two samples: (1) an adolescent sample of high school students and (2) an adult sample of employees. The methods used in each sample were comparable but with some important adaptations to the specific population and context. Below we describe the methods for each sample separately. Descriptive statistics are displayed in Table 1.

Table 1
Descriptive Statistics of the Adolescent and Adult Sample

Variable	<i>N</i> items	<i>M</i>	<i>SD</i>	α	1	2	3
Adolescents							
1. Cyberbullying victimization	11	0.13	0.17	.79	-		
2. Adjusting	7	3.07	0.83	.77	-.19***	-	
3. Concealing	8	2.75	0.77	.74	.05	.37***	-
Adults							
1. Cyberbullying victimization	10	1.10	0.23	.81	-		
2. Reappraisal	6	4.23	1.06	.86	-0.1	-	
3. Suppression	4	3.69	1.22	.85	.10*	.25*	-

* $p < .05$, ** $p < .01$, *** $p < .001$.

PARTICIPANTS

ADOLESCENTS

The adolescent participants were 1,715 students (54% female) in the first year of secondary education (equivalent to US grade 7) from 13 randomly selected schools from the province of Antwerp in Belgium. 89% of the students were in the general education program and 11% in vocational education. They were on average 13.6 years old (range 10-15).

ADULTS

The adult participants were 1,426 employees (46% male), who were recruited from Flemish organizations in Belgium. The majority was highly educated: 67% of the participants had more than a high school degree. 92% of them worked in the public sector. Their mean age was 42 years (range 18-69).

MEASURES

ADOLESCENTS

Cyberbullying victimization. We used the 11-item European Cyberbullying Intervention Project Questionnaire (Brighi et al., 2012; Del Rey et al., 2015; Schultze-Krumbholz et al., 2015) to assess the adolescents' cyberbullying victimization experiences. For each of 11 statements about cyberbullying (e.g., "Someone said mean things about you online"), the participants were asked whether they had experienced these forms of behavior in the past six months, on a 5-point Likert-type scale ranging from *Never* to *Every day*. For the purpose of this study, the items were dichotomized such that all *Never*-answers were coded as 0 and all others as 1 (indicating victimization). Dichotomizing ordinal variables is a common practice in latent class analysis to ensure interpretability of results (Collins & Lanza, 2010). With a Cronbach's alpha of .79, this scale's reliability was good.

Emotion regulation. The Affective Style Questionnaire (Hofmann & Kashdan, 2010) was used to measure adolescents' tendencies to habitually use two types of emotion regulation strategies: *Adjusting* (five items; e.g., "I can avoid getting upset by taking a different perspective on things") and *Concealing* (eight items; e.g., "I am good at hiding my feelings").

Adjusting refers to being able to readjust or balance emotions in response to contextual demands, and encompasses the habitual use of adaptive strategies such as reappraisal. Concealing refers to habitually suppressing and concealing emotions when they arise. The original scale has a third subscale, *Tolerating*, which was not used in this study because of its limited comparability to the adult emotion regulation subscales. On a 5-point Likert-type scale from 1 (*Not at all like me*) to 5 (*Totally like me*) participants reported how they usually behave. The subscales were reliable, as indicated by Cronbach's alpha values of .74 for *Concealing* and .77 for *Adjusting*.

ADULTS

Cyberbullying victimization. Adults' cyberbullying victimization experiences were assessed with the Inventory of Cyberbullying Acts at Work (ICAW; Vranjes, Baillien, Vandebosch, Erreygers, & De Witte, 2018). This 10-item scale measures cyberbullying victimization experiences at work on a 5-point Likert-type scale from *Never* to *Daily* and consists of three types of negative online acts: work-related (e.g., "Your e-mails are forwarded to third parties in order to harm you"), person-related (e.g., "You are being insulted, threatened or intimidated by means of ICT"), and intrusive (e.g., "Your personal information is hacked and used to harm you"). The scale's reliability was good (Cronbach's alpha of .81). For the purpose of this study, the items were dichotomized such that all *Never*-answers were coded as 0 and all others as 1 (indicating victimization).

Emotion regulation. The participants' use of emotion regulation strategies was assessed with the 10-item Emotion Regulation Questionnaire on a 7-point Likert-type scale from *Completely disagree* to *Completely agree* (Gross & John, 2003). This scale consists of two subscales: *Reappraisal* (e.g., "When I want to feel less negative emotions, I change the way I'm thinking about the situation") and *Suppression* (e.g., "When I am feeling negative emotions, I make sure not to express them"). The subscales showed good reliability in this sample (Cronbach's alphas of respectively .86 and .85).

PROCEDURE

ADOLESCENTS

First, the school principals provided active written consent. Then, all the first year students and their parents received leaflets with information about the study. A passive informed consent procedure was followed for the parents, and the students themselves had to provide active consent. Only 14 students opted out. The study also received approval by the Ethics Committee for the Social Sciences and Humanities of the University of Antwerp.

Surveys were administered in classes during school hours, either on paper or electronically, in the presence of a researcher and/or well-informed school staff. The participants did not have to disclose their name and were assured that their data would be treated confidentially. They were encouraged to ask questions verbally if they had trouble understanding survey questions or instructions.

ADULTS

The majority of adults (86%) were contacted via their employing organizations and were provided information about the study by means of e-mail. The remaining participants (14%) were recruited via social media, using the snowballing technique. The response rate for adults recruited through the organizations was 43%. All participants were informed that their participation was voluntary and could be terminated at any time. Surveys were administered electronically, either via the e-mail address of the participants (if contacted via organizations) or an open link (if recruited via social media). Participants were not asked to fill in any personal details and were assured that their data would be treated confidentially. The study received approval by the Social and Societal Ethics Committee of the KU Leuven.

DATA ANALYSIS

We conducted latent class analysis (LCA) with covariates in Mplus 7.4 (Muthén & Muthén, 2015). LCA is a person- and variable-centered technique for examining relationships among observed variables, which allows to assign individuals to groups or classes based on similar patterns of responses. To explore whether different groups or classes could be distinguished based on their cyberbullying victimization experiences, LCA models were

computed for adolescents and adults separately with up to 5 latent classes (see Table 2 & 3). To determine the “true” number of classes, model fit indices and interpretability were evaluated for each model. Six criteria were used: Akaike information criterion (AIC; smaller values are better), Bayesian information criterion (BIC; smaller values are better), the Vuong-Lo-Mendell-Rubin likelihood ratio test (VLMR LRT; if significant, the model fits better than a model with 1 class less), the bootstrap LR difference test (bootstrap LRT; if significant, the model fits better than a model with 1 class less), entropy (a measure of classification accuracy; the closer to 1, the better), and size of the smallest class (classes with few individuals may raise generalizability issues). For each sample, a model was selected based on a combination of model fit statistics and interpretability.

Table 2

Fit Indices of the Latent Class Models for the Adolescent Sample

Classes	1	2	3	4	5
AIC	13019.903	11231.692	10979.877	10904.958	10872.488
BIC	13079.222	11356.977	11170.528	11160.975	11193.871
VLMR LRT p	n/a	<.001	.015	.002	.041
Bootstrap LRT p	n/a	<.001	<.001	<.001	<.001
Entropy	n/a	.826	.863	.828	.810
Smallest class size	1715	503	74	65	64

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; VLMR LRT p = p -value of the Vuong-Lo-Mendell-Rubin likelihood ratio test; Bootstrap LRT p = p -value of the bootstrap likelihood ratio test.

Table 3

Fit Indices of the Latent Class Models for the Adult Sample

Classes	1	2	3	4	5
AIC	5920.553	5245.171	5151.112	5132.013	5137.095
BIC	5973.179	5355.686	5319.516	5358.306	5421.277
VLMR LRT p	n/a	<.001	.004	.100	0.714
Bootstrap LRT p	n/a	<.001	.004	.102	0.718
Entropy	n/a	.827	.817	.849	.873
Smallest class size	1426	212	38	13	16

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; VLMR LRT p = p -value of the Vuong-Lo-Mendell-Rubin likelihood ratio test; Bootstrap LRT p = p -value of the bootstrap likelihood ratio difference test.

To examine the association of class membership with emotion regulation strategies, we used the 3-step procedure for auxiliary variables in Mplus to include emotion regulation strategies (mean subscale scores) as latent class predictors (Asparouhov & Muthén, 2014).

The first step of this procedure consists of estimating the latent class model using only latent class indicator variables. The latent class posterior distribution from the first step is used to create the classification in the second step. The third step involves regressing the obtained classes on predictor variables (i.e., mean subscale scores of emotion regulation strategies) while accounting for the misclassification in the second step.

RESULTS

MODEL SELECTION AND NUMBER OF CLASSES

ADOLESCENTS

For the adolescents, based on the entropy, the three-class-model would be preferred, but the BIC favored the four-class-model and the AIC, VLMR LRT, and bootstrap LRT the five-class-model. The difference between the three- and four-class-model was that a small number of adolescents from the largest class formed a separate, fourth class, which mimicked the pattern of endorsement of cybervictimization items of the second largest class, but at a higher probability. The model with five classes included an extra class with medium endorsement of the same items as the second largest class. Because it was difficult to interpret and label the pattern of these classes and to make the distinction between these classes and the second largest class, the three-class-model was preferred (see Figure 1 and Table 4). The majority of adolescents (68%) displayed a pattern of low probability of endorsing any of the victimization items; therefore this class was labelled the *no cybervictimization* (NC) group. The second largest class (27%) displayed a relatively high probability of endorsing the items on verbal victimization and social exclusion and a relatively low probability on the other items. Because these types of victimization are not specific to the use of digital technologies and also often occur offline, we labelled this class the *similar-to-offline cybervictimization* (StO) group. Thirdly, a small proportion of the adolescents (4%) had a high probability of endorsing all the cybervictimization items; therefore this class was labelled the *pervasive cybervictimization* (PC) group.

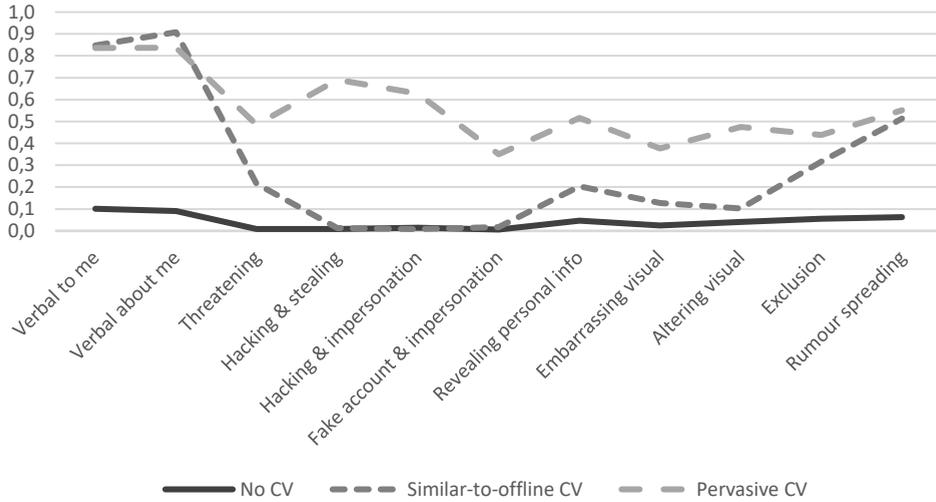


Figure 1. Probabilities of being victimized online per item of the European Cyberbullying Intervention Project Questionnaire for the three classes identified in the latent class analysis in the adolescent sample.

Table 4
Class Response Percentages for the ECIPQ (Adolescent Sample)

Item	No CV	StO CV	Pervasive CV
1 Someone said nasty things to me or called me names using texts or online messages	10.1	84.8	83.6
2 Someone said nasty things about me to others either online or through text messages	9.1	90.8	83.7
3 Someone threatened me through texts or online messages	0.8	21.6	48.5
4 Someone hacked into my account and stole personal information (e.g. through email or social networking accounts)	0.9	1.3	69.0
5 Someone hacked into my account and pretended to be me (e.g. through instant messaging or social networking accounts)	1.4	0.8	62.7
6 Someone created a fake account. pretending to be me (e.g. on Facebook or MSN)	0.6	1.7	35.0
7 Someone posted personal information about me online	4.6	20.4	51.6
8 Someone posted embarrassing videos or pictures of me online	2.5	12.7	37.6
9 Someone altered pictures or videos of me that I had posted online	4.1	10.3	47.5
10 I was excluded or ignored by others in a social networking site or internet chat room	5.6	31.7	43.9
11 Someone spread rumours about me on the internet	6.3	51.3	55.2

Note. CV = cybervictimization; StO = similar to offline.

ADULTS

For the adults, the AIC and entropy values were in favor of a five-class-model, but the VLMR LRT and bootstrapped LRT of this model were not significant, indicating that this model did not fit better than the model with three classes. Also, the five-class model had one very small class (only 16 individuals). Therefore, the model with three classes was selected (see Figure 2 and Table 5). This model had the best BIC value, a good entropy value and significant VLMR LRT and bootstrapped LRT values. The largest class (80%) displayed a low probability of endorsing any of the cybervictimization items; therefore this class was labeled as the *no cybervictimization* (NC) group. The second largest class (18%) displayed a high probability of endorsing the items specifically indicating work-related aggressive behavior (e.g., “Somebody is withholding e-mails or files you need, making your work more difficult”), but a low probability of endorsing the other items on cybervictimization; therefore this group was labelled as the *work-related cybervictimization* (WRC) group. Thirdly, about 3% of the adults had a higher probability of endorsing all the items than the two other classes. They had an especially high probability of endorsing the items “rumor spreading”, “e-mails, phone calls or messages ignored”, “e-mails forwarded to third parties”, and “work criticized”. Therefore, we labelled this class as the *pervasive cybervictimization* (PC) group.

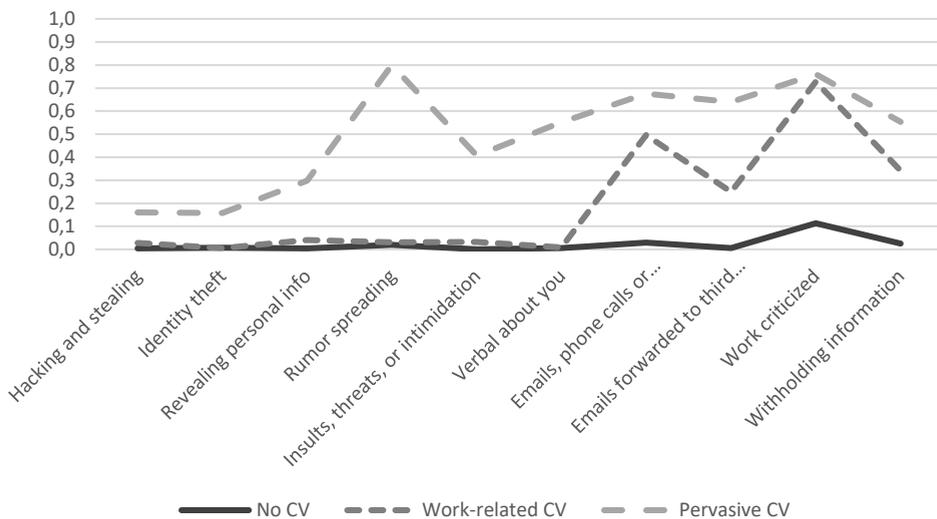


Figure 2. Probabilities of being victimized online per item of the Inventory of Cyberbullying Acts at Work for the three classes identified in the latent class analysis in the adult sample.

Table 5
Class Response Percentages for the ICAW (Adult Sample)

Item	No CV	WR CV	Pervasive CV
1 Your personal information is hacked and used to harm you	0.4	2.8	16.1
2 Somebody takes over your identity	0.7	0.5	15.8
3 Personal information about you is shared online or distributed via messages to others	0.5	4.1	29.8
4 Rumours or gossips are being spread about you by means of ICT	1.9	3.0	80.0
5 You are being insulted, threatened or intimidated by means of ICT	0.0	3.2	40.7
6 Constant remarks are being made about you and your private life by means of ICT	0.5	0.8	55.2
7 Your e-mails, phone calls or messages are ignored at work.	3.0	49.6	67.6
8 Your e-mails are forwarded to third parties in order to harm you.	0.5	25.0	63.9
9 Your work is criticized publicly by means of ICTs.	11.3	72.7	76.1
10 Somebody is withholding e-mails or files you need, making your work more difficult.	2.6	34.2	55.3

Note. CV = cybervictimization; WR = work-related.

ASSOCIATION OF CLASS MEMBERSHIP WITH EMOTION REGULATION

ADOLESCENTS

Both classes of cyberbullied adolescents concealed their emotions more often ($b_{PC \text{ vs } NC} = 0.682, p < .001$; $b_{StO \text{ vs } NC} = 0.932, p < .001$) and less often used adjusting ($b_{PC \text{ vs } NC} = -0.932, p < .001$; $b_{StO \text{ vs } NC} = -0.587, p < .001$) regulating styles than non-cyberbullied adolescents. Pervasively cyberbullied adolescents seemed to conceal even more ($b_{PC \text{ vs } StO} = 0.290, p = .127$) and adjust even less ($b_{PC \text{ vs } StO} = -0.346, p = .110$) than the similar-to-offline cyberbullied adolescents, but these differences were not significant.

ADULTS

Pervasively cyberbullied adults appeared to suppress their emotions significantly more than the other two groups ($b_{PC \text{ vs } WRC} = 0.154, p = .007$, $b_{PC \text{ vs } NC} = 0.170, p = .001$). There was no difference in suppression between the other two groups ($b_{WRC \text{ vs } NC} = 0.016, p = .436$). And there was no effect of reappraisal ($b_{PC \text{ vs } WRC} = -0.024, p = .562$, $b_{PC \text{ vs } NC} = -0.040, p = .288$, $b_{WRC \text{ vs } NC} = -0.015, p = .334$).

DISCUSSION

This study aimed to explore whether groups of adolescents and adults can be distinguished based on their patterns of cybervictimization and whether membership of these groups is associated with the use of particular emotion regulation strategies. The results of latent class analyses indicated three distinguishable profiles of cybervictimization in both populations: no cybervictimization (80%), work-related cybervictimization (18%), and pervasive cybervictimization (3%) among adults, and no cybervictimization (68%), similar-to-offline cybervictimization (27%), and pervasive cybervictimization (4%) among adolescents. These profiles differed in their use of emotion regulation strategies. In adults, only suppression differed significantly between groups with pervasive cyberbullying victims displaying significantly higher suppression rates than work-related victims and non-victims. In adolescents, the cyberbullied groups suppressed their emotions significantly more than the other groups, while the non-victimized group used reappraisal significantly more than the other groups.

As for the similarities, we found that the two populations could both be classified into three groups based on their cybervictimization experiences. Both adults and adolescents contained a no cybervictimization and a pervasive cybervictimization group. In addition, the work-related cybervictimization group in adults and the similar-to-offline cybervictimization group in adolescents both shared the characteristic that the type of acts they experience are also possible in traditional bullying behavior. Additionally, the prevalence rates for the pervasive cybervictimization groups were quite similar (3% of adults and 4% of adolescents). Lastly, we found that in both populations the emotion regulation strategy related to not showing one's authentic emotions (suppression or concealing) was associated with cyberbullying victimization.

As for the differences, firstly, the prevalence of cyberbullying victimization differed between the samples: Considerably fewer adults than adolescents reported experiencing cybervictimization (20 % versus 32%), which might be related to differences in exposure to and use of ICT. However, this could also relate to the different measurement instruments used and the fact that the adolescent scale also measures cyberbullying behavior not

related to the school context, while the adult scale is focused on work related relationships. Secondly, although the adolescent similar-to-offline cybervictimization group and the adult work-related cybervictimization group were similar in that they both experienced forms of behavior that could also occur offline, in adults these forms of behavior interfere with work performance, whereas this is not necessarily the case for adolescents' school functioning. Thirdly, in the adult sample there was no significant association of the emotion regulation strategy of reappraisal with group membership of any subgroup. However, we did observe meaningful differences in the adolescent sample with regard to the emotion regulation strategy of adjusting. That is, cyberbullied adolescents used significantly fewer adjusting emotion regulation strategies than non-cyberbullied adolescents. Overall, the associations with emotion regulation appeared to be stronger for adolescents than for adults, which might be an indication that emotion regulation has a stronger link with cyberbullying involvement in adolescence than later in life.

Because we aimed to select suitable and age-appropriate measures for each population, a limitation of our study is that the measures of cyberbullying and emotion regulation were not entirely equivalent, although, there was a large overlap in the constructs and the meanings of the items. The measure of adult cybervictimization contains items on work-related cybervictimization, whereas the measure of adolescent cybervictimization does not contain school-related cybervictimization items. In fact, measures of adolescent (cyber)bullying generally do not include task-related bullying experiences; they only focus on the social aspects of bullying. However, previous research has shown that victims are cyberbullied most frequently by a student at school, and that perpetrators most frequently cyberbully another student at school (Kowalski & Limber, 2007). Moreover, both the adult and adolescent bullying literature have largely developed around the work and school context respectively. This is because most adults are employed and spend considerable time at work (Major, Klein, & Ehrhart, 2002) and because adolescents in industrialized countries spend the majority of their time in school-related activities (Larson & Verma, 1999).

For emotion regulation, the concepts of reappraisal and adjusting, and suppression and concealing are not fully equivalent, but they have been shown to be highly correlated ($r = .54$ and $r = .60$; Hofmann & Kashdan, 2010). Furthermore, the authors of the Affective Style

Questionnaire explicitly define concealing as “suppression and other response-focused strategies aimed at concealing and avoiding emotions after they arise” (Hofmann, Sawyer, Fang, & Asnaani, 2012, p. 412) and in a study on the validation of the ASQ in a Japanese population, they link adjusting and reappraisal by stating that “one aspect of adjusting is express emotion in accordance with the circumstances. This ability is considered to be required to reappraisal and flexibility” (Ito & Hofmann, 2014, p. 2). The small differences in operationalization of the concepts might be reflected in the results. However, it can be considered a strength that despite these differences, we still found large similarities in the patterns of both samples.

These findings have several implications. First of all, we observed similar patterns of cybervictimization in the adult and the adolescent sample. This is an important finding as it suggests that, despite their very different context, some similarities in this phenomenon exist: Either individuals are not cyberbullied at all, they experience similar to traditional cyberbullying behavior, or they experience almost all types of negative online behavior. Future studies could include traditional bullying behavior to investigate how these relate to their online counterpart in both samples, as has previously been done in the adolescent literature (Wang et al., 2012, 2010).

Second, in both samples, we found an association between emotion regulation and cyberbullying victimization. This adds to the literature as emotion regulation strategies have mostly been investigated in relation to cyberbullying perpetration (Baroncelli & Ciucci, 2014; Kokkinos & Voulgaridou, 2017). However, while empirical evidence suggests that emotion regulation plays a uniquely important role for cyberbullying as opposed to traditional bullying (Baroncelli & Ciucci, 2014; Cross et al., 2015), no explanations have been put forward so far in the literature as to why this relationship would exist. We suggest that this might be related to dysfunctional emotion-driven behavior committed online by individuals who are not capable of effectively regulating their negative emotions. In support, several recent studies have found that posting messages regarding negative affect and posting indiscrete or negative content puts individuals at risk of becoming cyberbullied (Dredge, Gleeson, & de la Piedad Garcia, 2014; Peluchette, Karl, Wood, & Williams, 2015). Furthermore, negative emotionality motivates people to engage in risky behavior in order

to escape these aversive emotional states (Cooper, Agocha, & Sheldon, 2000) and this behavior again increases the chance of becoming victimized online (Erdur-Baker, 2010; Li, 2006; Wolak, Mitchell, & Finkelhor, 2007; Ybarra & Mitchell, 2004).

However, due to the cross-sectional nature of this study, the direction of causality cannot be established. Empirical evidence suggests that reappraisal is an adaptive emotion regulation strategy, related to greater experience and expression of positive emotions, and less experience and expression of negative emotions (Gross & John, 2003; Larsen et al., 2012). Suppression, however, is found to have negative effects, such as reduction of positive affect, weakening of social ties, and avoidant, diverted, and anxious relational behavior (Gross & John, 2003; John & Gross, 2004; Larsen et al., 2012). We therefore believe that individuals who often suppress their emotions are at greater risk of becoming victimized, while reappraisal acts as a protective factor (Vranjes et al., 2017). However, some empirical evidence also suggests that in order to cope with cyberbullying, many victims use passive emotion-focused coping strategies (Lodge & Frydenberg, 2007; Mahady Wilton, Craig, & Pepler, 2000). Additionally, this type of coping is generally ineffective (Mahady Wilton et al., 2000), making individuals even more vulnerable to abuse. This would explain why the pervasively cybervictimized group displayed the highest levels of suppression. Future studies should therefore apply longitudinal or experimental designs in order to test the direction of causality in the link between suppression and cybervictimization.

CONCLUSION

Among adolescents as well as adults, three groups of people can be distinguished based on their pattern of cyberbullying victimization experiences: no cybervictimization, similar-to-offline (for adolescents) or work-related (for adults) cybervictimization, and pervasive cybervictimization. The use of suppressing emotion regulation strategies is associated with severe cyberbullying victimization in adolescents as well as in adults. Thus, suppressing emotions seems to be related to cyberbullying involvement in adolescence as well as in adulthood, and considering emotion regulation strategies might be a useful addition for cyberbullying prevention and intervention approaches.

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GENERAL DISCUSSION AND CONCLUSION

This dissertation addressed adolescents' computer-mediated antisocial and prosocial behavior, with a specific focus on the emotional dynamics associated with these behaviors. What follows is a brief summary of the key findings that emerged from the empirical studies undertaken in the course of this doctoral project, a discussion of their implications for research and practice, and a reflection on the limitations, accompanied by suggestions for future research.

SUMMARY OF KEY FINDINGS

Two understudied topics received special attention in this dissertation: adolescents' online prosocial behavior and the emotional processes associated with online social behavior. The findings on these topics are discussed in the following subsections.

ONLINE PROSOCIAL BEHAVIOR

The majority of research on adolescents' online social behavior has focused on antisocial behavior, such as cyberbullying. This dissertation aimed to broaden the research focus by including adolescents' online prosocial behavior as well. However, validated instruments to assess online prosocial behavior were lacking. Therefore, in Chapter 1 an Online Prosocial Behavior Scale was developed and validated, and used in the subsequent chapters. Online prosocial behavior correlated positively with offline prosocial behavior and frequency of digital media use, and also, rather surprisingly, with online antisocial behavior, perhaps reflecting that when adolescents go online more often, they engage more in all kinds of social behavior.

In Chapter 2, the longitudinal bidirectional associations between acting prosocially or antisocially online and experiencing others behaving prosocially or antisocially online were explored. Findings from this study indicated that whereas experiencing antisocial behavior and acting antisocially online were not associated with each other within individuals over time, experiencing prosocial behavior and behaving prosocially online *were* associated with each other within individuals over time. Stated differently, adolescents who experienced others behaving prosocially online towards them, later behaved more prosocially themselves, whereas this pattern was not observed for antisocial behavior. These findings

are particularly relevant for practice, as it appears that online prosocial behavior may generate a snowball effect, such that adolescents who are the beneficiary of kind acts of others online, start acting more kindly towards others online themselves. Thus, by encouraging teenagers to act more prosocially online, they may stimulate their peers to do the same, which might contribute to the establishment of perceived social norms of cyberfriendliness online.

Chapter 4 explored the role of emotions and types of media use in adolescents' online prosocial and antisocial behavior. An important finding of this study was that adolescents' online behavior is far more often prosocial than antisocial. Thus, this study shows that online prosocial behavior is not a marginal phenomenon in adolescence, but quite the contrary. As such, the findings contribute to the existing research on adolescents' online social behavior by showing an important and largely neglected other side of the coin. Although already more than a decade ago other scholars have plead for research to study adolescents' prosocial and antisocial behavior simultaneously (Veenstra, 2006), up to now there remains a scarcity of studies that have examined both behaviors concurrently. A central contribution of this chapter and Chapter 2 is the concurrent examination of adolescents' online prosocial and antisocial behavior in the online context, showing that these behaviors differ markedly in prevalence and in dynamic development over time.

In Chapter 5, the associations between emotions and online prosocial behavior were examined within days and within persons. The results of the daily diary study among adolescents and their parents suggested that happiness spills over from school to home and crosses over from mothers to their daughters. Furthermore, the happier adolescent girls were at home, the more online prosocial behavior they reported the same day. Thus, the findings from this chapter indicate that positive emotions are also associated with online prosocial behavior at the micro level. This corroborates previous research findings on the links of positive emotions (Bartlett & DeSteno, 2006; Eisenberg, 2015; Karremans, 2005) and happiness (Aknin, Broesch, Hamlin, & Van de Vondervoort, 2015; Aknin, Hamlin, & Dunn, 2012; Nelson, Layous, Cole, & Lyubomirsky, 2016; Otake, Shimai, Tanaka-Matsumi, Otsui, & Fredrickson, 2006) with (offline) prosocial behavior. However, this study appears to be the first to show that happiness is also linked with *online* prosocial behavior on a daily,

within-person level. Nevertheless, the findings from the study were not entirely consistent, as the effect of happiness on online prosocial behavior was only significant for girls, but not boys, and the crossover of happiness only occurred between mothers and daughters and not in the other dyads. Future research should include possible moderating and mediating variables to determine the reasons behind these gender differences.

Together, these findings contribute to our understanding of adolescents' online interactions. If the amount of research on a topic would be a good indication of its prevalence, one would be led to believe that adolescents' behavior online is far more antisocial than prosocial in nature. However, the findings from this dissertation paint a different picture, showing that adolescents' online behavior is more often prosocial than antisocial, and that there is a (weak) association between online prosocial and antisocial behavior. Moreover, positive emotions seem to stimulate prosocial behavior, as do experiences with others behaving prosocially online towards oneself. Positive emotions also spill over from the school to the home context and cross over from mothers to daughters. These findings can have important implications for practice by pointing to cues for interventions aiming to boost online prosocial behavior.

EMOTIONAL PROCESSES

Emotional processes associated with adolescents' online social behavior were the second central topic of this dissertation. Throughout chapters 3 to 7, two affective facets were explored: emotion experience and emotion regulation.

In Chapter 3, anger was found to mediate the association between poor sleep quality and cyberbullying perpetration. These findings support the affective route to aggression as proposed by the General Aggression Model (GAM; Anderson & Bushman, 2002) and are in line with previous findings on the associations between bad sleep, anger, and aggression (Kamphuis & Lancel, 2015; Krizan & Herlache, 2016), and between anger and cyberbullying (Ak, Özdemir, & Kuzucu, 2015; den Hamer, Konijn, & Keijer, 2014). This study contributes to the existing literature by supporting the applicability of theorized affective aggression processes in the online context and by confirming the anger – cyberbullying link in a longitudinal study (as opposed to previous cross-sectional evidence).

The findings of Chapter 4 indicate that adolescents' online social behaviors are associated with their emotions, such that experiencing more positive and negative emotions seems to be associated with more prosocial and antisocial online behavior. Adolescents' social and audiovisual media use (e.g., Facebook, Youtube) partly explained these associations: the increased involvement in online prosocial behavior associated with the experience of positive and negative emotions was partially mediated by increased use of social and audiovisual media, as was the increased involvement in online antisocial behavior associated with the experience of negative emotions. The association between positive emotions and online antisocial behavior was even fully explained by social and audiovisual media use. Thus, in this study, a specific form of media use was shown to mediate the association between adolescents' emotions and online social behavior, indicating that the experience of emotions *per se* may not always directly stimulate prosocial or antisocial behavior online, but if emotionally aroused adolescents turn to audiovisual or social media, their likelihood for involvement in online social behavior increases. These findings lend support to the proposed idea that one of the processes underlying adolescents' online behavior is emotion regulation, as adolescents could be inclined to use audiovisual or social media for the social sharing of emotions (Rimé, 2009) and for mood management (Zillmann, 1988), and this use is associated with online prosocial and antisocial behavior.

Although most findings of this study were as expected, an unexpected finding was that, even after adding the mediating variables, experiencing negative emotions was still directly and positively related to performing online prosocial behavior. Importantly, in this study no distinction was made between negative outward-focused and negative inward-focused emotions; and the analyses were cross-sectional, so no causal interpretations are warranted. One possible explanation for the finding is that it was driven by those adolescents who experienced negative inward-focused emotions (e.g., sadness) and turned to others online for help, thereby eliciting prosocial reactions from others. As the findings from Chapter 2 show that adolescents who are the beneficiary of online prosocial behavior start acting more prosocially themselves, in turn those social support-seeking adolescents might also report more engagement in online prosocial behavior towards others. More

research is needed to clarify the associations between specific negative emotions and online prosocial behavior.

Chapter 5 examined the associations between adolescents' happiness and online prosocial behavior on a daily level. Findings from this chapter indicated that adolescents take their school-related happiness home, and girls' (but not boys') happiness at home is associated with their online prosocial behavior that day. Moreover, mothers' work-related happiness seems to be transmitted to their daughters at home. Without discounting the non-significant association between boys' happiness and their online prosocial behavior, these findings partially confirm the hypothesis that adolescents' happiness predicts online prosocial behavior on a daily level, consistent with research on the association between happiness and offline prosocial behavior (Aknin et al., 2015, 2012). Moreover, for girls, their mothers' work-related happiness also indirectly predicts their online prosocial behavior via the positive effect on girls' own happiness at home. Thus, happiness seems to engender a ripple effect across contexts, between (female) individuals, and to prosocial behavior.

Chapter 6 extended the findings from previous chapters on the emotion – online social behavior link by adding an antecedent (negative events) and moderating factor (affective style, i.e., individuals' habitual emotion regulation tendency), combined in a moderated mediation analysis of negative events, emotions, affective styles, and cybervictimization. Consistent with the findings from Chapter 5, the results of this chapter showed that negative emotions were related to cybervictimization. Negative emotions also mediated the association between negative events and cybervictimization. Furthermore, the association between negative events and emotions was moderated by concealing and tolerating affective styles, such that adolescents who habitually concealed or tolerated their emotions were more likely to experience negative emotions associated with negative events, especially when they experienced few negative events. These findings indicate that negative emotions not only play a mediating role in the association of daily life functioning with cyberbullying perpetration (see Chapter 3), but also with cyberbullying victimization. The results are in line with previous research on the association of maladaptive emotion regulation with involvement in traditional bullying (e.g., Shields & Cicchetti, 2001) and cyberbullying (e.g., Baroncelli & Ciucci, 2014). However, this appears to be the first study

that also examined the influence of contextual factors (negative daily life events) and the moderating effect of emotion regulation tendencies on the association of these contextual factors with negative emotions and cybervictimization. Together, the findings further illustrate the importance of taking person-context-interactions into account when studying adolescents' online social behavior.

Finally, Chapter 7 also examined the association between emotion regulation and cybervictimization but via a different approach, namely through the use of a person-centered analysis (latent class analysis). An added value of this study was that it combined data from adolescents and adults. This allowed us to compare patterns of cybervictimization and emotion regulation in two populations. These patterns were quite similar but also showed some unique features. That is, although overall the rates of cybervictimization were higher in adolescents than in adults, in both samples three groups of individuals could be distinguished based on their cybervictimization involvement, and the group of pervasively cyberbullied individuals was the smallest in each sample (3-5%). Also, pervasively cyberbullied individuals suppressed their emotions the most in both samples. As for differences between the samples, it appeared that cyberbullied adolescents, but not adults, used less adaptive (i.e., adjusting) emotion regulation strategies than non-victims. This research was cross-sectional, so no causal or temporal interpretations can be made. Nevertheless, the findings of Chapter 6 and 7 indicate that adolescents' emotion regulation tendencies seem to be related to their online antisocial behavior, and it would be a fruitful area for future research to further clarify the role of emotion regulation in online social behavior.

In all, the findings from this dissertation suggest that emotional processes, linked with daily life functioning, appear to be one of the factors that contribute to adolescents' online prosocial and antisocial behavior. The experience of both positive and negative emotions seems to be linked with adolescents' online social behavior. In particular, anger seems to be associated with acting antisocially online, and happiness with acting prosocially. Moreover, happiness and online prosocial behavior may create reinforcing spirals of positivity. Together, these findings support the expected associations between emotions and online social behavior, as discussed in the introduction of this thesis, although one

unexpected association was found between negative emotions and acting prosocially online. In general, therefore, it seems that the processes that drive adolescents' online social behavior are in part affective, and that some adolescents may behave prosocially or antisocially online in an attempt to regulate their emotions.

The findings from the studies part of this dissertation yield several contributions to the current literature. Firstly, the work presented here provides one of the first studies of adolescents' online prosocial behavior, resulting in a measurement instrument that can be used to further advance the research on this behavior and providing insight into its associated affective factors and short- and long-term dynamics. Secondly, the findings confirm the idea that anger fuels online antisocial behavior (cyberbullying) and they further extend the emotion – online behavior link to other emotional experiences and to online prosocial behavior. Finally, the findings contribute to our (still limited) understanding of the link between emotion regulation processes and online social behavior, and will hopefully inspire future research into this topic.

STRENGTHS, LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

This dissertation further advances the research on adolescents' online social behavior on methodological grounds. Two key strengths of the survey study were its large sample size and longitudinal design, which allowed to track participants over an extended time span (12 months) and to analyze the development of their online social behavior and affective processes. Additionally, the diary study shed light on the short-term dynamics of adolescents' online social behavior and emotion, and explored how family processes contribute to these dynamics. Both studies allowed for analyses at the within-person and the between-person level, giving insight into intraindividual processes next to (more commonly researched) interindividual processes.

Notwithstanding this dissertation's contributions, many questions on the emotional processes underlying online social behavior remain to be answered. The two methods used in this study, a longitudinal survey and a daily diary, have been underused in the domain of research on adolescents' social behavior, in which cross-sectional studies prevail. However,

these methods also have their drawbacks, such as participant drop-out and respondent fatigue (i.e., the phenomenon that participants become tired or bored of completing the surveys and the quality of their answers deteriorates), which can have significant implications for the representativeness of the sample and the quality of the data. To enrich our knowledge and to further unravel the dynamics behind adolescents' online social behavior, triangulation with other research methods would be welcome, in particular qualitative and experimental methods (although these methods can also suffer from drop-out and respondent fatigue). Qualitative methods, such as focus groups or interviews, could shed more light on how personal and contextual processes influence adolescents' online social behavior, and on the interaction between these processes. Qualitative research could also elucidate to what degree adolescents consciously or deliberately engage in online social behavior to regulate their affective state, and how aware they are of emotional processes guiding their behavior. Although a few qualitative studies have been conducted on cyberbullying (e.g., Vandebosch & Van Cleemput, 2008), qualitative studies with a focus on emotional processes in online antisocial *and* prosocial behavior would be beneficial to acquire a deeper understanding of the affective forces behind adolescents' online social behavior. Additionally, experiments could answer the question of whether emotions truly fuel (mild forms of) antisocial and prosocial behavior, and of which emotions are the strongest predictors. For example, a specific emotional state could be induced, followed by the opportunity to (hypothetically) interact with peers online (e.g., with the help of simulation social network sites, Wolf et al., 2015). In that way, the direct effect of emotional experience on online social behavior could be examined. However, doing experiments to examine online antisocial behavior can be problematic and unethical. Caution should be applied in how this behavior is measured so as not to stimulate actual cyberbullying behavior and inflict harm on participants.

Another issue in the research on emotional processes in online behavior is the assessment of emotions. Per definition, an emotion is a reaction to a stimulus. Therefore, an individual's emotions can change rapidly in response to changes. In the survey study, we first asked participants about specific events they could have experienced in the past month and then assessed participants' emotions in that month. In that way, we hoped that thinking about

specific experiences of the past month would help them remember the emotions they experienced. However, the time span of one month is long, considering that emotions tend to fluctuate rapidly in response to external or internal influences, and that it may not be easy to remember how often a specific emotion was experienced across this time period. Moreover, asking participants to differentiate between distinct emotions implies a level of emotional knowledge that not all adolescents may have mastered equally (Ciarrochi, Heaven, & Supavadeeprasit, 2008). In our survey study nine distinct emotions were assessed (anger, fear, sadness, shame, guilt, jealousy, happiness, pride, feeling loved), but apart from anger and happiness (which have been associated with antisocial and prosocial behavior in previous studies), no consistent associations of the other emotions with online behavior were found. Although theoretically the nine emotions should have loaded on three factors (anger and jealousy as negative outward-focused emotions, fear, sadness, shame, and guilt as negative inward-focused emotions, and happiness, pride, and feeling loved as positive emotions), factor analysis did not confirm this three-factor structure, which precluded further analysis with these factors. Perhaps better results would have been obtained if multi-item measures of the emotions were used, which was not done in this study due to survey length and time constraints. Future research could benefit from using more sensitive emotion measures. In the diary study, the time lag between emotions and behavior was much shorter (a few hours). However, that might still be too long to determine whether emotions immediately precede online behavior, since emotions can fluctuate rapidly over the course of minutes or hours. Therefore, future research using more intensive experience sampling methods, in which participants are measured very frequently over the course of a day, could shed more light on whether emotions are immediate predictors of online social behavior. Our experience with electronic diaries was very promising in that regard, and the popularity of smartphones will make intensive experience sampling research online or via apps substantially easier in the future (see e.g., Thomas & Azmitia, 2016). If ethically possible, electronic forms of experience sampling research could not only be used to assess emotional experiences, but also to record participants' actual online behavior (rather than self-reports of behavior) and to track participants' offline contexts.

Relatedly, the assessment of emotion regulation in this study also had its limitations. Most measures of emotion regulation, including the scale that was used in this dissertation, assess emotion regulation by asking how individuals habitually regulate their emotions across situations. However, how adaptive emotion regulation strategies are, seems to be dependent on the specific context in which they are used (Aldao, Sheppes, & Gross, 2015; Haines et al., 2016; Lazarus & Folkman, 1987). Therefore, instead of assessing general emotion regulation tendencies across contexts, future research on the association between emotion regulation and online social behavior could benefit from taking the specific situation in which the strategies are used into account. This might be difficult in survey research, but via experience sampling studies participants' use of emotion regulation strategies in specific situations can more easily be assessed (e.g., Haines et al., 2016).

Another measurement issue relates to the distinction between cyberbullying and online antisocial behavior. There is an ongoing debate about the definition and measurement of cyberbullying, and about whether cyberbullying should be considered a specific type of bullying or should be reframed as cyber aggression (or online antisocial behavior) (for contrasting views, see Corcoran, Mc Guckin, & Prentice, 2015; Olweus & Limber, 2018). Most cyberbullying researchers state that in order for online antisocial behavior to be considered cyberbullying, three criteria must be met (in accordance with the conceptualization of traditional bullying): intent to harm, repetition, and power imbalance (Smith, del Barrio, & Tokunaga, 2013). In my view, cyberbullying can be considered a specific form of online antisocial behavior, but not all instances of online antisocial behavior are cyberbullying. For instance, when someone responds to a peer's post with a mean comment, that is not necessarily an instance of cyberbullying: if it happens only once between individuals who otherwise do not behave unfriendly towards each other, it is not considered cyberbullying; however, if it is one of many negative acts of that individual towards this peer who does not appreciate it and cannot do much against it, it could be regarded as an act of cyberbullying. Nevertheless, because most research on online antisocial behavior to date has used the term *cyberbullying* in referring to the phenomenon under investigation, whether or not the behavior measured actually met the three criteria, in some publications I have also used the term cyberbullying when actually measuring

online antisocial behavior. In my opinion, even though cyberbullying, online aggression, and other forms of online antisocial behavior can surely be distinguished theoretically, integrating these constructs would be more useful for practice, as to further enhance the knowledge on how all kinds of online antisocial behavior can be prevented and diminished (for a similar discussion of overlapping constructs in the field of workplace aggression, see Hershcovis, 2011). Even though I think much of the existing research has examined behavior that should actually be categorized as online antisocial behavior rather than cyberbullying, because the latter term is far more prevalent, pragmatically it is perhaps the easiest to continue using this term also in the research on (all forms of) online antisocial behavior.

The longitudinal survey contained two measures in that regard: a single-item measure of cyberbullying and a multi-item measure of online antisocial behavior, both based on previous cyberbullying research (where these measures were referred to as a direct and an indirect measure of cyberbullying, respectively). For the single-item measure, first a definition of cyberbullying was provided, illustrated with examples, and then participants were asked whether they had been involved in cyberbullying as a perpetrator or victim in the past six months. Those participants who answered this question affirmatively were subsequently asked to indicate which type(s) of cyberbullying (verbal, visual, social exclusion, or impersonation) they had been involved in. The multi-item measure consisted of a longer list of online antisocial behaviors for which participants had to indicate their experience with each of these acts in the past month, and the word cyberbullying was not mentioned. Experience with these acts does not necessarily indicate involvement in cyberbullying, as these acts of online antisocial behavior are often not perceived as real bullying (Vandebosch & Van Cleemput, 2009). Although strictly speaking the multi-item measure does not necessarily measure cyberbullying, it was originally developed as a cyberbullying measure (Brighi et al., 2012), and the multi-item format has many statistical and cross-national comparison advantages over the single-item measure of cyberbullying (Yanagida et al., 2016). In my view, both measures have their strengths and weaknesses, and they complement each other. The multi-item measure assesses adolescents' involvement in (all possible forms of) online antisocial behavior and has superior statistical qualities, but the single-item measure is more suited to assess adolescents' involvement in

cyberbullying (or more serious, intentional, and power-imbalanced acts of online antisocial behavior). Because of the superior statistical properties, future research could benefit from using multi-item measures of online antisocial behavior, perhaps supplemented with questions on the perceived intentionality, repetition, and power imbalance to determine whether the behavior could be classified as cyberbullying. This would also allow to investigate to which extent these criteria influence outcome variables, and could help settle the debate on the usefulness to study cyberbullying as a distinct phenomenon.

Finally, it should be acknowledged that this dissertation used a top-down-approach to select possible influencing factors of adolescents' online social behavior. Based on theory and previous empirical research, the focus was on emotional experience and emotion regulation as possible processes behind adolescents' online social behavior. A bottom-up approach wherein adolescents' own perspectives and opinions are explored, could provide valuable additional insights into the processes behind their online behavior. Research methods that more actively engage participants in the research, such as having participants take screenshots of their online interactions (Pabian et al., 2018) or use social media to communicate with the researcher (Baker, 2013), have the potential to provide highly original and novel contributions to the field.

IMPLICATIONS FOR THEORY AND RESEARCH

Notwithstanding these limitations, the findings of this dissertation tie in with several theories and models that have been developed to explain human aggression, workplace (bullying) behavior, prosocial behavior, emotional processes, and online behavior, such as the General Aggression Model (GAM; Anderson & Bushman, 2002), the Affective Events Theory (AET; Weiss & Cropanzano, 1996) the Broaden-and-Build Theory (BBT; Fredrickson & Joiner, 2002), the Social Sharing of Emotions Theory (SSET; Rimé, 2009), and Mood Management Theory (MMT; Zillmann, 1988). More recently, Schramm and Cohen (2017) have reviewed and integrated the research on individuals' media use for emotion regulation. Their review shows that individuals often use media as a tool to help them in their emotional regulation efforts, by selectively exposing themselves to different types of media content, or by choosing different types of (mostly traditional) media platforms. The

authors also discuss a number of individual difference variables that determine when and how individuals use media for emotional regulation. The studies presented in this dissertation contribute to this review by shedding more light on adolescents' emotion-guided behavior using *new* (social) technologies (ICT).

Findings from this dissertation suggest that adolescents also turn to ICT (next to traditional media) for emotion regulation. I suggest that adolescents' emotion-guided use of ICT can be categorized into three types: content, self-expression, and behavior.

Firstly, adolescents can use ICT to select specific *content* to help them regulate their emotions. For instance, they can listen to happy music online to lift their feelings of sadness. This selection of content can happen unconsciously or deliberately, and the content can be positive or negative (Schramm & Wirth, 2008). Although mood management theory (Zillmann, 1988) posits that people's mood-related media use is motivated by hedonism (minimizing or avoiding unpleasant states and maximizing or maintaining pleasant states), previous research has shown that emotion regulation via media usage is not only motivated by hedonism, but can also be motivated by eudaimonic motives (for reviews, see Schramm & Wirth, 2008; Vorderer & Reinecke, 2015). In that regard, Oliver and Raney (2011) posit that "people consume media entertainment in the pursuit of pleasure and amusement (hedonic motivations) and as a part of their general need to search for and ponder life's meaning, truths, and purposes—motivations that we characterize as "eudaimonic" (in addition to other motivations)" (p. 985). Thus, individuals do not necessarily want to improve their emotional state or maintain their already positive state (hedonic motivations), they may also derive gratification and meaning from 'negative' (e.g., sad) media content that does not provide immediate pleasure or amusement (Parrott, 1993; Vorderer & Reinecke, 2015). For example, people experiencing sadness often want to listen to sad music because they want to feel understood and justify their feelings (Zillmann, 2000), or to reinforce their feelings and wallow in them to thoroughly process the problem that elicited the sadness (Schramm, 2005). It has also been suggested that deliberate emotion regulation efforts via media are guided by the appraisal of the emotion (e.g., "is this emotion justified in this situation?") rather than by the (primary) emotion itself (Bartsch, Vorderer, Mangold, & Viehoff, 2008), and can therefore also be directed at

sustaining a negative emotional state. For instance, a person who feels sad after the death of a family member may think that emotion is justified given the circumstances and watch sad movies to endorse and validate that feeling.

Secondly, adolescents may turn to ICT for *self-expression*. The online context stimulates adolescents' self-disclosure (Valkenburg & Peter, 2011) and expression of emotion (Derks, Fischer, & Bos, 2008). Digital media are also ideal platforms for the social sharing of emotions (e.g., Bazarova, Choi, Sosik, Cosley, & Whitlock, 2015). The social sharing of emotion enables interpersonal emotion regulation (turning to others to cope with emotions; Zaki & Williams, 2013). Thus, whereas emotion-guided ICT use focused on content can help in *intrapersonal* emotion regulation, emotion-guided ICT use for social contact can help in *interpersonal* emotion regulation.

Thirdly, adolescents' emotion-guided ICT use can be prosocial or antisocial *behavior*. Rather than expressing his or her feelings, the adolescent acts on his or her emotions. Findings from this dissertation lend tentative support to this third type of emotion-guided ICT use. It seems that when adolescents experience increased negative emotions and anger, they act more antisocially online, whereas increased positive emotions and happiness stimulate online prosocial behavior. However, our findings also suggest that negative emotions can stimulate online prosocial behavior. It is important to keep in mind that adolescents' emotion-guided ICT use may not be restricted to one type of ICT use, but that the types of ICT use (and platform) can be combined and that adolescents can rapidly switch between them (Schramm & Cohen, 2017). That might be one explanation for why initially negative emotions can also stimulate online prosocial behavior: adolescents may, for instance, first share their emotions with others and then, perhaps out of gratitude, act prosocially towards the peers who supported them. Alternatively, adolescents might negatively appraise their primary emotion (e.g., "I should not feel sorry for myself, I should be strong") and this could motivate emotion regulation efforts to avoid, diminish, or alter the primary emotion (Bartsch et al., 2008). In that way, even negative emotions could guide online prosocial behavior (e.g., when envy is appraised as inappropriate and the adolescent tries not to give in to his envy by deliberately acting nicely towards others).

Together with the aforementioned theories and review, the findings of this dissertation can be used to formulate a proposal for an integrated model of emotion-guided media use, as displayed in Figure 1.

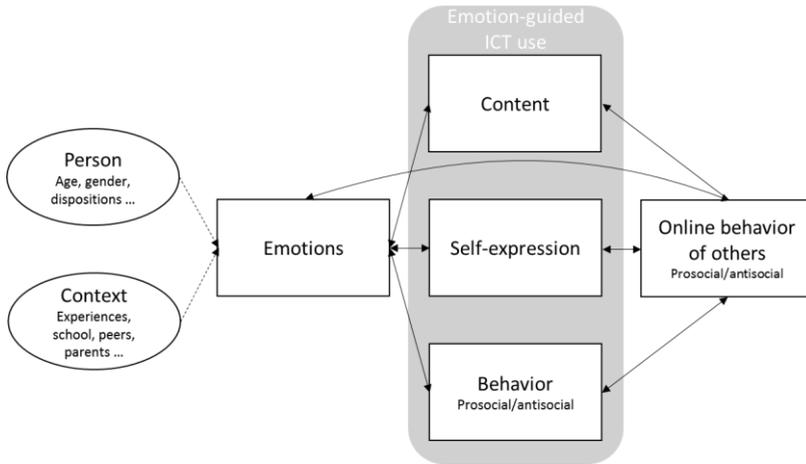


Figure 1. Proposal for a model of emotion-guided ICT use.

Person (e.g., age, gender, emotion regulation dispositions) and context (e.g., experienced events, peer influences, interactions with parents) variables directly and indirectly influence the emotions adolescents experience, and interact with each other (see also Schramm & Cohen, 2017). For instance, peer rejection generally elicits negative emotions, but more so in girls than boys (Morrow, Hubbard, Barhight, & Thomson, 2014). Individuals often turn to media to aid in their emotion regulation efforts (Schramm & Wirth, 2008), although of course there are many other ways in which individuals can regulate their emotions that do not involve ICT. As explained above, emotion-guided ICT use can be directed towards content, self-expression, or behavior. The findings from this dissertation tie into emotion-guided ICT-behavior, as they show that positive and negative emotional states are associated with online prosocial and antisocial behavior. Other studies have shown that adolescents' emotion-guided ICT use can also be a combination or sequence of different uses. For instance, den Hamer and Konijn have proposed a cyclic process model of cyberbullying in which victimization-related anger predicts turning to antisocial media content, and consuming antisocial media content mediates the association between anger

and cyberbullying perpetration (den Hamer & Konijn, 2016; den Hamer et al., 2014). When adolescents use ICT for social contact or to behave prosocially or antisocially towards others, they may in turn become the recipient of online prosocial or antisocial behavior of others towards them. For instance, expressing sadness may induce social support online, and harassing others may result in being attacked online oneself. Online social behaviors of others can in turn influence one's own emotions and emotion-guided ICT use. For example, being the target of online antisocial behavior may induce sadness, which may in turn be shared with another peer online. As such, this model proposes bidirectional processes in which emotions influence emotion-guided ICT use, and ICT use influences emotions (cf., Reinforcing Spirals Model, Broaden-and-Build Theory, Differential Susceptibility to Media Effects Model).

It needs to be taken into account that there are many other ways in which individuals can regulate their emotions or cope with situations. These may also influence their emotions, their ICT use and the online actions of others towards them. For instance, it has been shown that maladaptive emotion regulation skills for negative emotions may place children at risk for peer bullying victimization (Godleski, Kamper, Ostrov, Hart, & Blakely-McClure, 2015) and this may be true as well for cyberbullying victimization (see Chapter 6). Furthermore, online prosocial and antisocial behavior can also be motivated by other factors, such as cognitive or social processes (cf., Differential Susceptibility to Media Effects Model; Valkenburg & Peter, 2013).

Some important side notes regarding the proposed model need to be taken into account. Firstly, the findings of this dissertation provide support for some parts of the model, but more research is needed to test all the proposed (bidirectional) associations. For instance, our results suggest that experiencing anger and happiness is associated with online antisocial and prosocial behavior, but further studies are needed to examine the effects of other specific emotions and emotional states (e.g., boredom) on online social behavior. Secondly, adolescents' behavioral reactions to emotions may be either conscious or deliberate, or impulsive (cf., proactive versus reactive aggression, Crick & Dodge, 1996). Especially online adolescents often act on impulse, due to the combination of their immature prefrontal control system (Harden & Tucker-Drob, 2011) with the online

disinhibition effect (Suler, 2004). Thirdly, according to Gross' (1998) process model of emotion regulation, two types of emotion regulation can be distinguished: *antecedent-focused* emotion regulation strategies, namely situation selection, situation modification, attentional deployment, and cognitive change, and *response-focused* strategies, namely response modulation. Although the proposed model focuses on emotion regulation after emotions are elicited, it does not contend that emotion regulation via digital media is necessarily only response-focused. Emotion regulation via digital media can also take place *before* an emotion response is activated, e.g., watching funny videos can be a form of attentional deployment. Fourthly, this is a model of the *emotional* or *affective* processes in adolescents' ICT use. Of course, many other processes also guide this behavior, such as cognitive, motivational, social, and contextual features, and it is the combination of these that will ultimately determine adolescents' behavior. Lastly, future research should shed more light on the temporal order of this behavior. Our research has shown that cyberbullying perpetration and victimization do not mutually predict each other over a time frame of six months, but perhaps victimization does predict perpetration in a shorter time period.

In what follows, I would like to propose some suggestions to further advance theory on adolescents' online social behavior. For starters, more interdisciplinary efforts combining research on antisocial and prosocial behavior should be encouraged. Strangely enough, historically, these dimensions have mostly been studied separately, even though there is considerable overlap in the types of determinants associated with these behaviors (Veenstra, 2006). The findings from this dissertation suggest that both dimensions of online behavior are associated with emotional experience (perhaps even sometimes with the same emotions), notwithstanding that online prosocial and antisocial behavior also differ in prevalence and in dynamic development over time.

Additionally, integrating research from the domains of psychology and communication studies, and of school bullying and workplace bullying, would be beneficial to further enhance the knowledge on adolescents' online social behavior. This dissertation and the work of my colleague Ivana Vranjes, who has made significant theoretical and empirical contributions to the literature on adult cyberbullying in the workplace (see e.g., Vranjes,

Baillien, Vandebosch, Erreygers, & De Witte, 2017), is the result of such a cross-fertilization between different research traditions. Combining the different theoretical views, methods, and statistical expertise of these fields has introduced original perspectives to the adolescent online behavior literature, e.g., by exploring the role of daily experiences and affective processes in adolescents' online social behavior. Scholars mostly stay within the traditions of their research domains, confirming expected patterns while often being oblivious of research on closely related topics studied from a different angle by scholars from other domains. For instance, the research on school bullying and workplace bullying (or mobbing) has developed independently, with different focuses and methods of analysis. However, these traditions could inspire each other by testing theories developed in one domain in the other domain, as was partly done in this dissertation by applying workplace bullying theories on the effect of stress and emotions to adolescent cyberbullying.

When applying theories from other research domains to adolescents' online behavior, the developmental aspect of adolescence needs to be taken into account (cf., as is explicitly done in the Differential Susceptibility to Media Effects Model, Valkenburg & Peter, 2013). As explained in the introduction of this dissertation, the imbalance in the development of the subcortical socio-emotional versus the prefrontal cognitive control system in the brain makes adolescents more sensitive to rewards and potentially damaging but exciting activities, at a time when their impulse control and inhibition abilities are not fully developed yet (Harden & Tucker-Drob, 2011). Additionally, the discrepancy between their physical maturation on the one hand, and their lack of adult rights and privileges on the other hand, combined with significant peer pressure, stimulates adolescents to free themselves from adult rules and regulations. Next to the specific features of the *online* context, these biopsychosocial aspects of adolescence should be bore in mind when applying adult theories to adolescent online behavior. For instance, the association between stress, emotions, and antisocial behavior that has been proposed by theories of adult workplace behavior research (e.g., AET; Weiss & Cropanzano, 1996) might be slightly different for adolescents' online antisocial behavior: Adolescents are on average less able to adaptively regulate their emotions and to control their inhibitions, which may be further exacerbated in the online context by the online disinhibition effect (Suler, 2004), leading to

more impulsive versus thoughtful behavior. Combining what we know from different research domains about adolescent development, emotional processes, antisocial and prosocial behavior, and online behavior, will lead to more accurate knowledge on adolescents' online behavior and will help improve both theories on the mechanisms behind this behavior as well as practical interventions to influence this behavior.

IMPLICATIONS FOR PREVENTION AND INTERVENTION

The findings of this dissertation suggest two topics that can be especially relevant for intervention and prevention: emotion regulation and online prosocial behavior.

Firstly, the results of our studies suggest that adolescents' emotional experience is associated with their online social behavior, and that online antisocial behavior is associated with less adaptive emotion regulation (also in adults). These findings add to the considerable body of literature documenting the association between emotion regulation deficiencies and maladaptive outcomes for psychological functioning in children and adolescents (for a review, see Zeman, Cassano, Perry-Parrish, & Stegall, 2006). On average, adolescents experience more intense emotions than adults, and more negative emotions than younger and older age groups (Larson, Csikszentmihalyi, & Graef, 1980; Rosenblum & Lewis, 2003). Additionally, middle adolescents on average have the smallest repertoire of adaptive emotion regulation strategies (Zimmermann & Iwanski, 2014). This combination of heightened emotionality with low emotion regulation abilities may make adolescents' behavior particularly susceptible to emotional influences, which may be exacerbated online because the features of the online context lower behavioral disinhibitions even further (Suler, 2004). Intervention and prevention programs targeting adolescents' online antisocial behavior (cyberbullying) may benefit from including an emotion regulation component in their programs. Of course, many other variables also influence adolescents' online antisocial behavior, so cyberbullying programs should definitely include other components on the cognitive, social, and motivational factors influencing this behavior. Nevertheless, adding an emotion regulation module to new or existing programs might not only help reducing cyberbullying behavior, but also benefit adolescents' functioning as a whole. Given that maladaptive emotion regulation also appears to be associated with cyberbullying

victimization in adulthood, helping individuals develop adaptive emotion regulation skills in adolescence could foster their resilience to cope with online peer victimization later in life as well. Several programs specifically developed to improve adolescents' emotion regulation skills have already been developed, such as Tuned In (Dingle, Hodges, & Kunde, 2016) and Learning to BREATHE (Metz et al., 2013). Integrating (parts of) these programs into programs targeting adolescent (cyber)bullying may be a promising avenue that might enhance cyberbullying intervention efforts by teaching adolescents different, more adaptive strategies to cope with intense emotions. Additionally, some features of the online context stimulate antisocial online behavior, but online platforms can take measures to reduce this behavior. For instance, automatic monitoring of user-generated content (i.e., systems that apply automatic text- and image-categorization techniques using machine learning, Delort, Arunasalam, & Paris, 2011) could detect potentially harmful content or negative emotions and stimulate users to reflect before they post (Van Royen, Poels, Vandebosch, & Adam, 2017).

Secondly, findings from this dissertation indicate that online prosocial behavior is already very common among adolescents, and is much more frequent than online antisocial behavior. By emphasizing how 'standard' this behavior is and highlighting how many adolescents are acting prosocially online, adolescents' perceived social norms of online behavior may shift to the direction of prosocialness. Our research suggests that online prosocial behavior occurs in reinforcing cycles, such that those who experience others behaving prosocially towards them, subsequently act more prosocially towards others themselves. Thus, stimulating online prosocial behavior may be a strategy that has widespread effects, not only for the adolescents directly involved, but also for the people they interact with online, and so forth. Further, our findings on the association of happiness and online prosocial behavior suggest that when adolescents feel good, they do good online. To further encourage adolescents' online prosocial behavior, interventions that increase well-being may be a promising avenue. The literature on positive psychology can provide useful suggestions in that regard (Seligman, Ernst, Gillham, Reivich, & Linkins, 2009; Sin & Lyubomirsky, 2009; Waters, 2011). Examples of positive psychology interventions include *gratitude visit* (writing and delivering a letter to thank someone whom you never

thanked before), *counting kindness* (writing down the acts of kindness you perform), *gift of time* (devoting additional time to persons you care about by contacting or meeting them), and *three good things* (writing down three good things that have happened to you and explaining why these things happened). Even when these interventions are delivered online, they have been shown to be effective in increasing happiness (Gander, Proyer, Ruch, & Wyss, 2013), which might be particularly interesting for the technology-embracing adolescent population (Baños et al., 2017).

FINAL WORDS

This dissertation focused on emotional processes in adolescents' online behavior, but of course there are many other factors that also influence online social behavior. This dissertation adds a small piece to that puzzle, and I hope that future research will shed more light on the predictors, moderators, and mediators that influence adolescents' online social behavior.

The focus on emotional processes of this dissertation coincides with increased attention towards emotional processes in therapeutic practice (e.g., Renna, Quintero, Fresco, & Mennin, 2017; Samoilov & Goldfried, 2006). More and more, researchers and practitioners alike recognize the relevance of affective processes for human functioning, in addition to and in interaction with cognitive and social processes. Perhaps one of the reasons why this topic fascinates me so much, is that I have also experienced its relevance in practice. As a practicing clinical psychologist, I have seen many individuals struggle with their emotions, because they feel overwhelmed by them, rigidly try to control them with reason, or do not know how to regulate them properly. The positive effects of helping these individuals cultivate adaptive and flexible emotion regulation strategies are often remarkable. The centrality of emotion regulation skills for long-term health and well-being calls for prevention and intervention efforts starting from young age. It is encouraging that some school programs promoting students' well-being, such as *Leefsleutels* in Flanders, already incorporate strategies on coping with emotions, as these may be universally beneficial, not only for online social behavior, but for many other life domains.

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All chapters

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Chapter-specific additional author contributions

Chapter 1: Development of a Measure of Adolescents' Online Prosocial Behavior

Chapter conceptualization, data collection, data analysis, and writing (first draft preparation): Sara Erreygers. Reviewing and editing first drafts: Sara Erreygers and Heidi Vandebosch.

Chapter 2: Positive or Negative Spirals of Online Behavior? Exploring Reciprocal Associations Between Being the Actor and the Recipient of Prosocial and Antisocial Behavior Online

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Chapter 5: Feel Good, Do Good Online? Spillover and Crossover Effects of Happiness on Adolescents' Online Prosocial Behavior

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Chapter 6: The Interplay of Negative Experiences, Emotions and Affective Styles in Adolescents' Cybervictimization: A Moderated Mediation Analysis

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Chapter 7: Patterns of Cybervictimization and Emotion Regulation in Adolescents and Adults

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