Chapter 5

Adolescents' Use of Media with Antisocial and Risk Behavior Content Increases Their Cyberbullying Behavior Over Time

Abstract

The aim of this study was to examine the effect of adolescents' exposure to media portraying antisocial and risk behavior on cyberbullying behavior over time. Previous research established relatively high prevalence of cyberbullying behavior among adolescents, whereas not much is known about the possible predictors of cyberbullying behavior. This study examines the long term effects of media exposure herein. Furthermore, we examined whether boys and girls differ in this respect. The long term effects were tested in a longitudinal design with three waves (N = 1005; age range 11 – 17; 49% boys). Measured variables: cyberbullying behavior and exposure to media with antisocial and risk behavior content. Results of mixed model analyses showed that higher levels of exposure to media with antisocial and risk behavior content significantly contributed to higher initial rates of cyberbullying behavior. Moreover, an increase in exposure to antisocial media content was significantly related to an increase in cyberbullying behavior over time. For both boys and girls higher exposure to antisocial and risk behavior media content increases cyberbullying behavior over time, though more clearly for boys than for girls. This study provided empirical support for the amplifying effect of exposure to antisocial media content on adolescents' cyberbullying behavior over time. Results are discussed in view of adolescents' media use and the larger theoretical framework.

Keywords:
Cyberbullying, Adolescents, Media Exposure, Longitudinal, Antisocial Content, Sex differences

Adolescents' Use of Media with Antisocial and Risk Behavior Content Increases Their Cyberbullying Behavior Over Time

Cyberbullying behavior received much research attention over the past few years, likely due to the prevalence of cyberbullying incidents reported in the media with severe consequences (e.g., see special journal issues about cyberbullying) (Dehue, 2013; Koops, 2012). Research shows that cyberbullying negatively affects adolescents' self-esteem, academic performances, and suicidal ideation, amongst others (Bauman, Toomey, & Walker, 2013; Hinduja & Patchin, 2010; Kowalski & Limber, 2013; Mesch, 2009; Wang, Nansel, Iannotti, 2011). Although not much is known about possible predictors of cyberbullying behavior, previous research showed that one such factor is media exposure. Former studies found significant relationships between exposure to media with violent content and *face-to-face* bullying as well as *cyber*bullying (Calvete, Orue, Estévez, Villardón, & Padilla, 2010; Dittrick, Beran, Mishna, Hetherington, & Shariff, 2013; Fanti, Demetriou, & Hawa, 2012; Kuntsche, 2004; Lam, Cheng, & Liu, 2013; Lee & Kim, 2004). Recent research included a broader scope of antisocial media exposure, including not only violence portrayals but also other types of antisocial and risk behavior content such as substance abuse, sexual intimidation, to be related to cyberbullying behavior (Den Hamer, Konijn, & Keijer, 2014). However, to our knowledge, no research exists thus far that examined the longer term relationships between exposure to antisocial media content and cyberbullying behavior among adolescents, in particular not by means of a longitudinal investigation. The current study therefore, applied a longitudinal design in investigating the assumed amplifying effect of exposure to media with antisocial and risk behavior content on cyberbullying behavior over time.

In the following, we elaborate the argumentation underlying our hypotheses stating that both higher initial levels of adolescents' exposure to media content portraying antisocial and risk behavior, and increases over time coalesce with higher levels of cyberbullying behavior. Furthermore, we assumed this effect to be stronger for boys than for girls. Subsequently, we proceed in detailing our methodological approach and reporting the results. Finally, we discuss some limitations as well as the theoretical implications of our study in view of future research.

5

The Role of Media in Cyberbullying Behavior

Given the abundant media use of today's adolescents, it is an important question how repeated exposure to specific content may influence cyberbullying behavior as this peaks during adolescence. Thus far, the role of media exposure in adolescents' cyberbullying behavior has only been studied to a limited extent. Three previous studies showed significant relationships between high exposure to violent media content and an increase in *face-to-face* bullying behavior (Dittrick et al., 2013; Kuntsche, 2004; Lee & Kim, 2004). Furthermore, four other studies found a positive relationship between violent media use and *cyber*bullying behavior (Calvete et al., 2010; Dittrick et al., 2013; Fanti et al., 2012; Lam et al., 2013). In a recent cross-sectional study, exposure to a broader category of antisocial and risk behavior media content (i.e., broader than *violent* media content alone) was positively related to cyberbullying behavior (Den Hamer et al., 2014). However, the longer term influence of repeated exposure to media with antisocial and risk behavior content on adolescents' cyberbullying behavior is not yet known.

   In the current study, we propose an amplifying effect of antisocial media exposure on cyberbullying behavior over time, which is supported by developmental theories as well as by Social Cognitive Theory (Bandura, 2001) and the Downward Spiral Model (Slater, Henry, Swaim, & Anderson, 2003). Social Cognitive Theory suggests that individuals vicariously learn from what they encounter in the media, especially because such behaviors are often rewarded in violent video games, movies, clips, and television shows (Bandura, 2001; Dal Cin, Stoolmiller, & Sargent, 2012; Konijn, Nije Bijvank, & Bushman, 2007). Furthermore, our assumption of an amplifying association between exposure to antisocial and risk behavior media content and cyberbullying behavior is in line with the Downward Spiral Model (Slater et al., 2003). The Downward Spiral Model proposes that violent media use and aggressive behavior mutually reinforce each other. These lines of thought were recently brought together and supported by a study showing that adolescents' exposure to media with antisocial and risk behavior content significantly contributed to explain the association between being bullied in class (*face-to-face* victimization) and becoming a cyberbully oneself (Den Hamer et al., 2014).

   Due to their developmental stage, adolescents are looking for attractive role models to identify with, which they find abundantly in the media (Konijn et al., 2007). This might make them specifically susceptible to model their behavior after the media models they look up to. Accordingly, antisocial media

content in which antisocial and risk behavior such as swearing, fighting, and substance abuse is portrayed, and often glorified, seems highly popular among adolescents (Strasburger, 2009; Strasburger, Jordan, & Donnerstein, 2010). This may coincide with the need they feel to portray deviant behaviors in search for an independent identity (Arnett, 1992; Moffitt, 1993; Spear, 2000). In extending this developmental line of reasoning together with the Social Cognitive Theory and Downward Spiral Model, we argue that adolescents' media exposure will play a role in their (cyber)bullying behavior. That is, adolescents who are repeatedly exposed to antisocial media content will more likely be influenced by such antisocial and deviant behaviors as portrayed in media offerings, and more likely to get involved in cyberbullying behaviors. Following the above, two hypotheses were formulated:

H1. Adolescents' exposure to antisocial media content is positively related to initial rates in cyberbullying behavior.

H2. An increase over time in adolescents' exposure to antisocial media content is positively related to an increase over time in cyberbullying behavior.

Gender Differences in Cyberbullying Behavior and the Role of Media

In *traditional* bullying, boys are more often the bullies and the aggression is often expressed directly (e.g., Hong & Espelage, 2012). Researchers hypothesized that in *cyber*bullying, girls would be more often the perpetrator, because cyberbullying involves more relational bullying than direct aggression (e.g., Kowalski & Limber, 2007). However, research regarding gender differences in cyberbullying behavior showed mixed results thus far (see meta-analysis Kowalski, Giumetti, Schroeder, & Lattaner, 2014). Some studies found that boys were more likely to be cyberbullies than girls (e.g., Calvete et al., 2010; Fanti et al., 2012), whereas others found girls to be more often a cyberbully than boys (e.g., Kowalski & Limber, 2007), and yet others found no gender differences in cyberbullying behavior (e.g., Hinduja & Patchin, 2008; Lonigro, Schneider, Laghi, Baiocco, Pallini, & Brunner, 2014; Smith et al., 2008). Given these mixed results, it is important to include gender in our analyses.

Developmental and media violence research showed that boys in general are more heavy consumers of violent and antisocial media content than girls (Kirsch, 2006; Konijn et al., 2007; Möller, Krahé, Busching, & Krause, 2011). Following the rationale of the Social Cognitive Theory and Downward Spiral Model, one would assume that this male preference for antisocial media content makes it more likely to find a stronger relationship between media use

and cyberbullying behavior for boys than for girls. Therefore, we proposed the following hypothesis:

H3. The influence of antisocial media exposure on cyberbullying behavior over time is stronger for boys than for girls.

Method

Participants and procedure. A total of 1005 adolescents participated in the study, aged 11 to 17 years old (*M-agewave1*=13.43, *SDage*=1.06; *M-agewave2*=13.62, *SDage*=1.07; *M-agewave3*=13.89, *SDage*=1.09). The three waves in the longitudinal design were spread over the beginning (T1), middle (T2), and end (T3) of a regular year in secondary school, located in two schools. Five hundred sixty eight respondents participated in all three waves, 326 respondents participated in two waves, and 111 respondents participated only in one wave. Variations occurred due to pupils' absences. Thus, the response rates in the three waves were 78.8%, 74.0%, and 75.6%, respectively. A total of 37.4% participants were in first-grade (aged around 12), 30.3% in second grade (aged around 13), and 32.5% third grade (aged around 14). The majority was White Caucasian (60.2%), others had a Turkish (20.2%), Surinam (4.9%), Moroccan (1.9%), or other background (12.8%). The Institutions' Committee on Human Subjects has approved the protocol of this study. Data were collected in class using a paper-pencil questionnaire. Responses were anonymous and a debriefing followed upon completion of questionnaires in class. Parental passive consent rate was 100% and none of the students refused to participate in the study, thanks to the participating schools and class-wise procedure. Each wave had about 20% missing data because students were absent due to external internships, and sickness (*nwave1*=792; 49% boys; *nwave2*=740; 49% boys; *nwave3*=762; 48% boys). Missing data were handled according to recent insights of Hotdeck Imputation (Myers, 2011). Decks used to impute missing data were gender, age, and grade.[4]

Measures. All measures were taken with Likert-type items, each followed by 5-point rating scales (1=*never*, 2=*incidentally*, 3=*several times*, 4=*often*, to 5=*very often*).

---

[4]   The longitudinal data described in this study was also used in Chapters 4 and 6.

Cyberbullying behavior. Cyberbullying behavior was measured using the Cyberbullying Questionnaire (CBQ) (Calvete et al., 2010). Because a number of items showed overlap given today's smartphone technology, we combined several items of the original 16 items, resulting in a total of 8 items. For example, "Sending threatening or insulting messages by e-mail" was combined with "Sending threatening or insulting messages by cell-phone". For the revised Cyberbullying Questionnaire, see Appendix A at the end of this chapter. Sumscores were calculated (minimum score 8, maximum score 40) and the resulting 8-item CB-Questionnaire was reliable with an average Cronbach α of .82 (average *Mean* over three waves=8.87, average *SD*=2.49). Some researchers argued that, in contrast to *face-to-face* bullying, repetitiveness is not a prerequisite for cyberbullying, because a single act such as spreading rumors about someone online can lead to ongoing humiliation and may last on the Internet forever (Dehue, 2013; Langos, 2012). Furthermore, adolescents may find it hard to admit that they performed cyberbullying behavior. This implies that an answer of "happened incidentally" could possibly mean that it happened more often. Therefore, a score higher than 8 on the Cyberbullying Questionnaire indicates that a respondent has been committing cyberbullying behavior.

Exposure to antisocial media content. Antisocial media exposure was measured by the 8-item antisocial media content factor of the Content-based Media Exposure Scale (C-ME) (Den Hamer et al., 2014). The C-ME-scale measures how often someone is exposed to portrayals of various types of antisocial and risk behavior as portrayed in media content, such as fighting, drug use, and general antisocial behaviors (e.g., stealing, destroying someone's property). The items were based on the extant literature regarding adolescent antisocial and risk behaviors (e.g., Hopf, Huber, & Weiss, 2008). Sample items are: "How often do you watch people who fight (*on the Internet/TV/DVD/in games/mobile phone*)?" and "How often do you watch people who destroy someone else's belongings (*on the Internet/TV/DVD/in games/mobile phone*)?". All items can be found in Appendix B, at the end of this chapter. The C-ME-scale was reliable with an average Cronbach α of .89 (average *Mean* over three waves=2.27, average *SD*=0.90). Mean centered scores were computed to use in further analyses.

Results

Preliminary Analyses

In order to examine the longitudinal model, a mixed model analysis (Heck, Thomas, & Tabata, 2013) was conducted in SPSS (version 19). In the mixed model analysis, several covariance structures of cyberbullying were tested. Based on these comparisons, using the Akaike Information Criterion (AIC) indices, a diagonal structure of the covariance matrix of random effects was selected (Heck et al., 2013). A mixed model with cyberbullying behavior, time and quadratic time was conducted (with diagonal covariance matrix) in order to analyze whether the effect of antisocial media exposure on cyberbullying behavior was linear or quadratic.

The Level 1 covariance structure implies that the residuals associated with individuals and time points are independent and normally distributed (Wald $Z=15.77$, $p<.001$). The estimates of fixed effects suggested that we should use the linear time variable instead of the quadratic time variable (linear: $t=2.26$, $p<.05$; quadratic: $t=-1.15$, $p=.12$) (Heck et al., 2013). A mixed model was conducted with cyberbullying behavior, time (three waves), exposure to media with antisocial and risk behavior content (mean centered), gender, an interaction between time and media, an interaction between time and gender, and a three-way interaction between time, media, and gender. Table 1 shows that respondents' initial cyberbullying intercept (β_{oo}) was 8.59. Time was significantly related to cyberbullying ($\beta_{01}=.19$, $t=2.53$, $p<.05$). This indicates that on average cyberbullying rates increased over each measurement interval within individuals.

Table 1 further shows that gender was not significantly related to differences in initial cyberbullying rates ($\beta_{03}=-.01$, t=-.05, $p=.96$) and the interaction effect of time and gender was not significant ($\beta_{05}=-.10$, t=-.94, $p=.35$). This means that boys do not make a different growth over time in cyberbullying rates than girls do (note that media exposure is not yet included). In Table 2, the descriptive statistics for cyberbullying rates are given, separated by gender. Independent t-tests showed that on all three timepoints, boys performed more cyberbullying behavior than girls (T1: $t(793)=2.66$, $p<.05$; T2: $t(743)=2.98$, $p<.01$; T3: $t(770)=3.67$, $p<.01$).

Table 1. Estimates of Fixed Effects of Cyberbullying

Parameter	Estimate	SE	β	df	t	p
Intercept	8.59	.13	-	642.08	63.81	.00
Time	.19	.08	-	663.07	2.53	.01
Media	.38	.12	-	780.38	3.15	.00
Gender	-.01	.20	-	644.80	-.05	.96
Time * Media	.33	.07	-	1061.54	4.73	.00
Time * Gender	-.10	.11	-	651.97	-.94	.35
Time * Media * Gender	-.28	.07	-	1455.84	-3.90	.00
Boys: Media_T2-T1	.65	.28	.14	-	2.35	.02
Girls: Media_T2-T1	.71	.20	.21	-	3.66	.00
Dependent: Δ Cyberbullying T2-T1						
Boys: Media_T3-T2	.64	.27	.14	-	2.41	.02
Girls: Media_T3-T2	.19	.16	.07	-	1.17	.24
Dependent: Δ Cyberbullying T3-T2						

Note. The upper half of the table represents the mixed model. Time, Media, and Gender in the first lines refer to main effects. Two-way interactions are indicated with one *, three-way interactions with two *. The bottom half of the table represents the two lineair regressions of media exposure on cyberbullying behavior, separated by gender. SE = Standard Error. β = Standardized Estimate. df = Degrees of Freedom. In the mixed model, no standardized estimates are provided. In the regressions, no degrees of freedom are provided.

Table 2. Cyberbullying Rates, Separated by Gender

Parameter	Mean	SD	df	t	p
Timepoint 1					
Boys (*N* = 389)	8.88	2.42			
Girls (*N* = 406)	8.51	1.34			
Independent T-test T1			793	2.66	.01
Timepoint 2					
Boys (*N* = 360)	9.19	3.12			
Girls (*N* = 385)	8.64	1.70			
Independent T-test T2			743	2.98	.00
Timepoint 3					
Boys (*N* = 368)	9.42	3.85			
Girls (*N* = 404)	8.62	1.73			
Independent T-test T3			770	3.67	.00

Note. df = Degrees of Freedom.

5

Testing Hypotheses: Exposure to Antisocial Media Content and Cyberbullying Behavior

To test the effect of exposure to media with antisocial and risk behavior content, the same model presented in Table 1 was used. Results showed that media exposure was significantly related to differences in initial cyberbullying ($\beta 02$=.38, t=3.15, p<.001). These results support H1: Higher levels of exposure to media with antisocial and risk behavior content significantly contributed to higher initial rates of cyberbullying behavior. Furthermore, the interaction of time and media exposure was significant ($\beta 04$=.33, t=4.73, p<.001), indicating that participants who are more exposed to antisocial media have a higher growth rate (i.e., a steeper slope) in cyberbullying rates.

Only for visualization purposes, a dummy variable was created for media exposure (0=lower than average or average antisocial media exposure;1=higher than average antisocial media exposure). Figure 1 shows that adolescents with higher than average exposure to media with antisocial content had higher initial cyberbullying rates than adolescents lower than average exposure to this media content (supported by the significant effect of media exposure on cyberbullying rates in Table 1). Furthermore, the slopes of cyberbullying rates over time of adolescents with higher exposure to antisocial media increased faster than the slopes of adolescents lower on media exposure (supported by the significant interaction effect of time and media exposure on cyberbullying rates). This supports hypothesis 2: The level of cyberbullying behavior increased faster over time with higher levels of exposure to antisocial media content.

Gender Differences in the Effect of Exposure to Antisocial Media Content on Cyberbullying Behavior

The third hypothesis suggested that antisocial media exposure on cyberbullying behavior over time influences boys more strongly than girls. The three-way interaction of time, media, and gender on cyberbullying rates was significant ($\beta 06$=-.28, t=-3.90, p<.001). Apparently, the slopes of time and media exposure on cyberbullying rates were different for boys and girls. Figures 2 and 3 visualize this difference. First, at T1, the gap in cyberbullying rates between those lower and those higher in media exposure is larger for boys than for girls. For both boys and girls, the slope for those higher in media exposure to antisocial and risk behavior content increases over time.
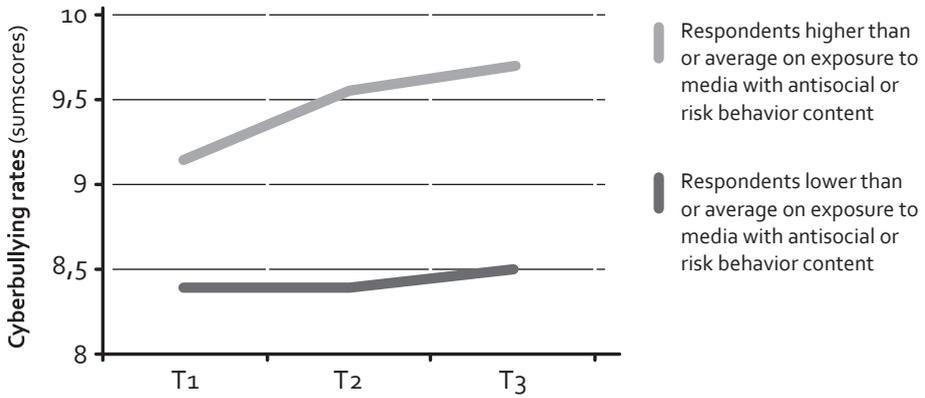
Figure 1. Cyberbullying Rates Over Time.

Note. The horizontal axis reflects the various timepoints during one regular school year.

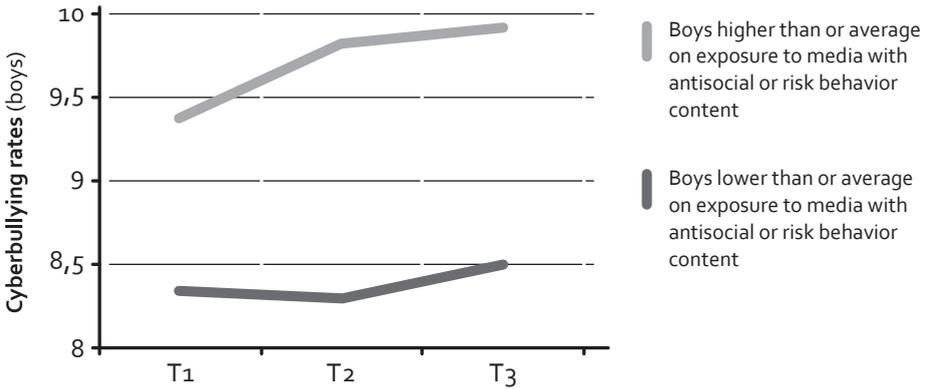The vertical axis reflects sumscored cyberbullying rates.

Figure 2. Cyberbullying Rates Over Time For Boys.

Note. The horizontal axis reflects the various timepoints during one regular school year.

The vertical axis reflects sumscored cyberbullying rates.

To fully understand the difference between boys and girls in the effect of antisocial media exposure on cyberbullying rates, posthoc analyses were conducted. Two regressions were performed to examine the separate slopes between the time intervals. Hence, four difference-score-variables were created: Cyberbully rate T2 minus T1 (cb_T2-T1 in Table 1); Cyberbully rate T3 minus T2 (cb_T3-T2); Media exposure T2 minus T1 (media_T2-T1); and Media exposure T3 minus T2 (media_T3-T2). A first regression analysis included cb_T2-T1 as the dependent variable and media_T2-T1 as the independent. The output was ordered by gender (Table 1). Results showed for both boys and girls that an increase in their media exposure resulted in an increase in their cyberbullying rates (βboys=.14, t=2.35, p<.05; βgirls=.21, t=3.64, p<.01). A second regression analysis investigated the change between T2 and T3 (dependent cb_T3-T2, independent media_T3-T2; Table 1). This time, the influence of increased media use on cyberbullying rates was significant for boys only (βboys=.14, t=2.41, p<.05), whereas not for girls (βgirls=.07, t=1.17, p=.24). Thus, although we see a continued increase in cyberbullying rates for girls high in media exposure over time (Figure 3), as for the boys, in the statistical test this increase among girls is weighed out by the decrease in cyberbullying rates for the girls low in media exposure. (Note, the dummy variable was created for visualization purposes only.)

Given these results, hypothesis 3 was partly supported; exposure to antisocial media and risk behavior content on cyberbullying behavior over time did influence boys more strongly than girls, but only in the longer run (i.e., not between T1-T2, but from T2-T3). For boys, an increase in exposure to media with antisocial content further increases cyberbullying behavior over time. However, for girls, after a significant increase between T1 and T2, a further increase in media exposure at T3 is less clear and explicitly holds for girls high in exposure to media with antisocial content.
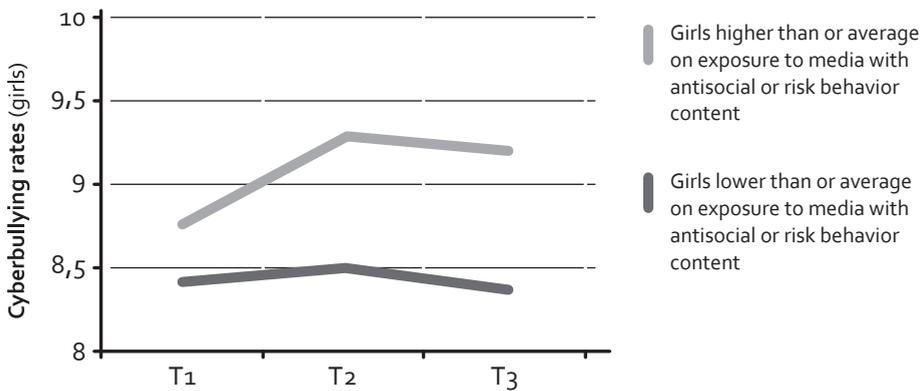
Cyberbullying rates (girls)

10
9,5
9
8,5
8

T1   T2   T3

Girls higher than or average on exposure to media with antisocial or risk behavior content

Girls lower than or average on exposure to media with antisocial or risk behavior content

Figure 3. Cyberbullying Rates Over Time For Girls.

Note. The horizontal axis reflects the various timepoints during one regular school year.

The vertical axis reflects sumscored cyberbullying rates.

5

Discussion

The current study aimed to examine how adolescents' exposure to antisocial and risk behavior content in popular media fare influences both initial cyberbullying behavior and in the longer term. The results of our three-wave longitudinal study showed that higher levels of exposure to media portraying antisocial and risk behavior significantly contributed to higher initial rates of cyberbullying behaviors in adolescents. Furthermore, the cyberbullying behavior increased faster over time with higher levels of exposure to antisocial media content. In addition, for both boys and girls, higher exposure to antisocial media content increases cyberbullying behavior over time, though more clearly for boys than for girls.

Our results are consistent with Social Cognitive Theory (Bandura, 2001), in terms of modeling or vicarious learning through role models and examples aired through media fare and the reinforcing impact of violent media on aggressive behavior. Next, results support the Downward Spiral Model (Slater et al., 2003), which proposes reinforcement between violent media exposure and aggressive behavior. Clearly, cyberbullying behavior can be seen as a form of aggressive behavior. Furthermore, the results are in line with previous findings in media effects on (cyber)bullying (Calvete et al., 2010; Den Hamer et al., 2014; Dittrick et al., 2013; Fanti et al., 2012; Kuntsche, 2004; Lam et al.,

2013; Lee & Kim, 2004). Our study not only confirms these lines of thought, but also extends the role of media in demonstrating that a wider array of media content including media portraying aggressive and antisocial behaviors as well as risk and deviant behaviors such as stealing and substance use, is significantly related to cyberbullying behavior among adolescents. Our findings further extend previous research in demonstrating that exposure to antisocial media content is not only related to cyberbullying at one particular point in time, but is also mutually related in increasing levels of cyberbullying behavior over time. Although boys and girls did not differ in this respect, the continued influence of media exposure on cyberbullying over time is stronger for boys than for girls. Perhaps, boys and girls differ in how they cope with unpleasant feelings related to cyberbullying which differentiates their behavioral response in the longer run. The generally higher levels of empathy in girls may, for example, prevent them from further increases as compared to boys (Mestre, Samper, Frías, & Tur, 2009). Future research is warranted here.

The strength of a longitudinal research design cannot prevent that this study also faced some limitations. First, cyberbullying behavior was measured using a self-report scale. Obviously, cyberbullying is a sensitive topic that is open to social desirability in answering questions. Possibly, the cyberbullying rates in this study are an underestimation of the true rates as is subject of discussion in many studies in cyberbullying (e.g., Dehue, Bolman, & Völlink, 2008; Gradinger, Strohmeier, Schiller, Stefanek, & Spiel, 2012; Kowalski & Limber, 2007; Schoffstall & Cohen, 2011; Walrave & Heirman, 2011). The prevalence rates of cyberbullying found in the current study (33.5% of boys and 24.4% of girls had committed cyberbullying behavior) were quite high, although no consensus exists on prevalence rates of cyberbullying perpetration. Most rates are below 20% (see meta-analysis Kowalski et al., 2014). Indeed, the prevalence rates appear to be quite different in international comparisons. This is in large part related to how the researchers define cyberbullying behavior, to sample differences in ages and countries, to the reported time frame (e.g., "last 6 months" or "lifetime"), and to the criteria applied to classify a participant as a cyberbully (see recent meta-analyses: Baek & Bullock, 2013; Kowalski et al., 2014). Important to note, however, is that despite a possible underestimation, significant effects were found; possibly, the relationship between exposure to antisocial media content and cyberbullying behavior is actually stronger than found in this study. Furthermore, boys reported higher levels of cyberbullying perpetration than girls. However, the cyberbully levels of boys and girls may in

fact not differ that much, but girls might be more inclined to socially desirable answers due to prosocial moral reasoning (Carlo, Eisenberg, & Knight, 1992). Future studies may include prosocial moral reasoning.

A second limitation of longitudinal designs is that a bias may occur as linked with attrition rate. However, the pupils did not know beforehand when we would attend their school for the 2nd and 3rd waves and thus cannot have deliberately dropped out to avoid participating in our study and dropping out of school during the year is quite uncommon. The class-wise procedure during school hours limited a naturally occurring attrition rate. However, each wave (including the 1st) had about 20% absence due to external internships and sickness. This is not attrition, but rather kind of random presence. Furthermore, whereas the adolescent participants were located in two schools, there is no reason to assume that the adolescents in the present study would substantially differ from others. Nevertheless, external validation should be further improved by replication studies.

A third limitation to the current study is that a longitudinal design can serve as a good indicator of causality, but causal inferences must still be viewed cautiously. Furthermore, previous research found a relationship between being a victim of (cyber)bullying behavior and becoming a cyberbully oneself (e.g., Den Hamer et al., 2014; Smith et al., 2008). In the current study, however, victimization was not taken into account. It is important to further study the role of victimization in the relation between exposure to media with antisocial and risk behavior content and cyberbullying behavior in future research. Likewise, other possible risk factors of cyberbullying behavior have been found in meta-analyses (Baek & Bullock, 2013; Kowalski et al., 2014) such as anger and frustration, mental health issues, and moral disengagement. Future research may examine the various weights of risk factors.

Summarizing, this study provided empirical support for the amplifying effect of adolescents' exposure to media portraying antisocial and risk behavior on cyberbullying behavior over time, for boys more strongly so than for girls. Expanding our knowledge about the underlying processes of cyberbullying and the role of media exposure therein among adolescents is highly relevant given the current prevalence of cyberbullying behavior and its severe consequences for the victims — even more so with the increasing prevalence and importance youngsters place on social media and the Internet. Our research indicates that media exposure plays a significant role in cyberbullying behavior and must be considered when developing prevention and intervention programs.

5

For example, media literacy lessons in which adolescents learn how media exposure may affect their attitudes and behavior. In all, our results indicate that adolescents' exposure to antisocial media content cannot just be considered a lighthearted leisure activity, but seriously amplifies cyberbullying behavior.

5

Appendix A:
All items of the revised Cyberbullying-Questionnaire

Instruction: Indicate for every statement how often the indicated behavior applies to you, regardless of whether you do this via a computer on the Internet, or with your mobile phone. Please, encircle one number for each statement.

	How often do you…	Never	Incidentally	Several times	Often	Very often
1	… send threatening or insulting messages by e-mail or mobile phone?	1	2	3	4	5
2	… hang humiliating images of classmates on the Internet or send links of these images to other people for them to see?	1	2	3	4	5
3	… write or send links of embarrassing jokes, rumors, gossip, etc. about a classmate to other people so they can read them?	1	2	3	4	5
4	… hack someone's email account to send messages by e-mail that could make trouble for the other person?	1	2	3	4	5
5	… record a video or take a cell phone picture of a classmate who is being laughed at by a group and forced to do something humiliating or ridiculous, or send such videos or photos to other people?	1	2	3	4	5
6	… broadcast online other people's secrets, compromising information or images?	1	2	3	4	5
7	… do you deliberately exclude someone from an online group?	1	2	3	4	5
8	… record a video or take cell phone pictures of classmates performing some kind of behavior of a sexual nature or send such videos or photos to other people?	1	2	3	4	5

Appendix B:
All items of the antisocial and risk behavior media content factor of the Content-based Media Exposure Scale (C-ME)

Instruction: Please, report for every question below <u>how often</u> you watch this on TV/Internet/DVD/ in games. This could be clips on You Tube, music videos, quiz shows, television shows, in video games, in the cinema, etcetera. So, it does not matter <u>where</u> you watch it, but <u>how often</u> you watch it.

Please, encircle one number for <u>each</u> statement below.

	How often do you watch (on the Internet/TV/DVD/in games/mobile phone) …	Never	Incidentally	Several times	Often	Very often
1	… people who fight?	1	2	3	4	5
2	… people who openly talk about sex?	1	2	3	4	5
3	…people who use drugs?	1	2	3	4	5
4	…people who destroy someone else's belongings?	1	2	3	4	5
5	… people who shoot at another person?	1	2	3	4	5
6	… people who drink a lot of alcohol?	1	2	3	4	5
7	…people who are having sex?	1	2	3	4	5
8	… people who steal?	1	2	3	4	5

5