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A different(ial) perspective:

How social context influences
the media violence-aggression
relationship among
early adolescents

Karin M. Fickers

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A different(ial) perspective:
How social context influences the
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among early adolescents

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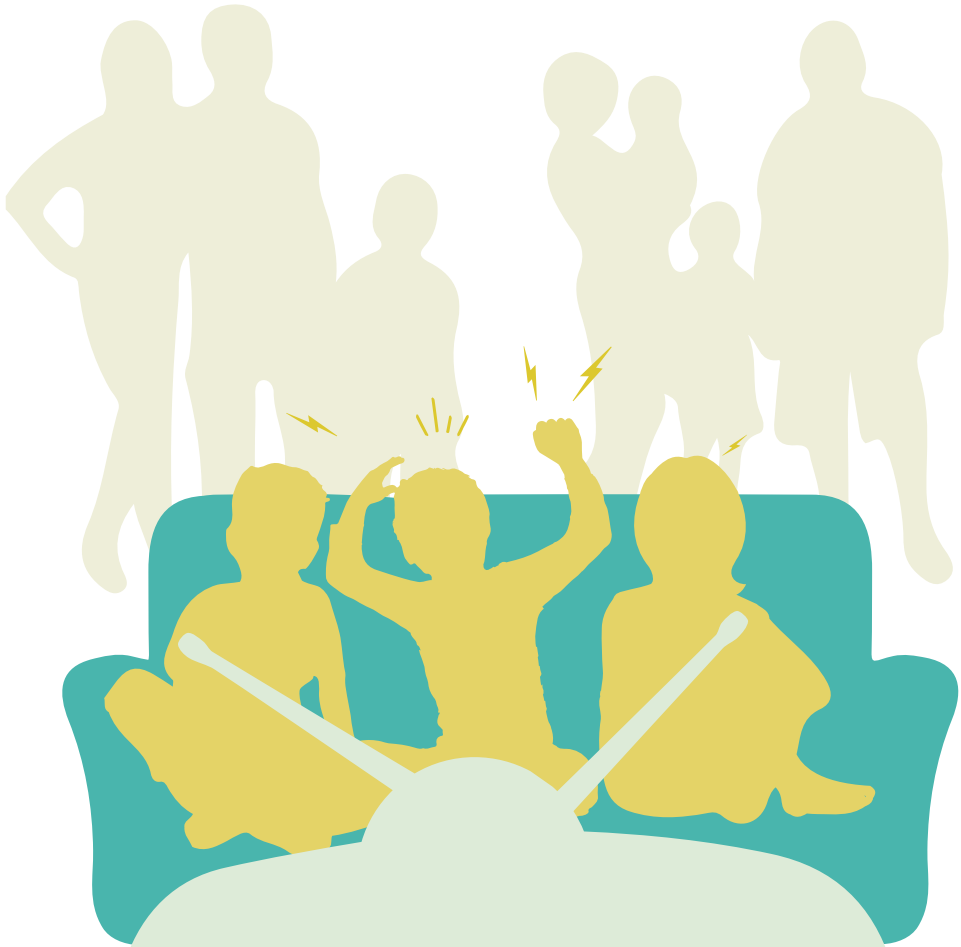
Faculteit der Maatschappij en Gedragwetenschappen

Normaal is niets anders dan
het gemiddelde van alle afwijkingen

Tuimeltekst (n.d.)

Table of contents

Chapter 1	Introduction and dissertation outline	9
Chapter 2	Assessing the reliability and validity of television and game violence exposure measures	21
Chapter 3	Double dose: High family conflict enhances the effect of media violence exposure on adolescents' aggression	49
Chapter 4	A matter of style? The differential effects of parental mediation on early adolescents' media violence exposure and aggression	65
Chapter 5	The role of perceived peer norms in the relationship between media violence exposure and adolescents' aggression	87
Chapter 6	Beyond the lab: Investigating early adolescents' cognitive, emotional, and arousal responses to violent games	109
Chapter 7	General conclusion and discussion	131
	English summary	147
	Nederlandse samenvatting	151
	References	155
	Author contributions	180
	Dankwoord	182
	About the author	188



Chapter 1

Introduction and
dissertation outline

Does media violence exposure lead to aggression?

My stepson (12 years) has been playing *Call of Duty Black Ops* since February. We wanted to limit it, but then he would just play at his friend's house. Since we've had the game, he gets angry or aggressive over nothing at all. At school, they're also having problems with his behavior. I'm not sure if it's the game, but it's certainly remarkable. *Parent in response to "Does my son become violent when playing Call of Duty Black Ops?" on mediaopvoeding.nl* (Nikken, 2011)

Well, sorry, but this is just ridiculous. I am 17 years old now and have been playing *Call of Duty* since I was 13, and it didn't make me violent. Games like that don't harm us, especially because they're not realistic. *Teen in response to "Does my son become violent when playing Call of Duty Black Ops?" on mediaopvoeding.nl* (Nikken, 2011)

"Anders Breivik 'trained' for shooting attacks by playing Call of Duty"
(Pidd, 2012, *The Guardian*)

"Don't blame video games for Anders Breivik's massacre"
(Parkin, 2012, *The Guardian*)

"Much ado about something: Violent video game effects and a school of red herring: Reply to Ferguson and Kilburn"
(Bushman, Rothstein, & Anderson, 2010, *Psychological Bulletin*)

"Much ado about nothing: The misestimation and over-interpretation of violent video game effects in Eastern and Western nations: Comment on Anderson et al." (Ferguson & Kilburn, 2010, *Psychological Bulletin*)

"Does doing media violence research make one aggressive?"
(Elson & Ferguson, 2014a, *European Psychologist*)

These quotes – from parents, children, journalists, and academics – are just a few of many examples that show how divided the views are about a relationship between media violence and aggression among youth. Some are critical of the idea that violent media can cause real-life aggressive behavior – often people who enjoy such content themselves and do not notice any effects. Others worry about possible adverse outcomes – such as parents who do not want their child to become aggressive. Concerns (and discussions) about the effects of violent entertainment are also regularly reflected in the media, for example when new and very violent games are released (Polak, 2013), or in the wake of horrific acts such as the shooting spree in Norway by Anders Breivik, who admitted using *Call of Duty: Modern Warfare 2* as a “training tool” (Pidd, 2012). And although concerns about adverse effects apply to media users of all ages, they are most pronounced for teens, who are among the heaviest users of violent media entertainment (Krahé, 2014a; Olson et al., 2007).

These different views about the effect of media violence on teens’ aggression are not only part of the daily debates between parents and children or discussions in the media, but are also part of academic discourse. Since the early days of cinema (and even the advent of comic book violence before that), researchers have studied *and* debated whether or not media violence leads to aggressive behavior (cf. Anderson, 1977). Almost a century later, there are still academics who maintain that media violence contributes to aggression and others who strongly disagree with this. Both have the same scientific evidence at their disposal, which shows that on average people who consume more violent media content also tend to score slightly higher on aggressive behavior (see meta-analyses by Anderson et al., 2010; Bushman & Huesmann, 2006; Ferguson & Kilburn, 2009; Greitemeyer & Mügge, 2014; Paik & Comstock, 1994; Sherry, 2001). However, what this small and positive relationship *means* is passionately debated. Some researchers (Anderson et al., 2010; Bushman et al., 2010) argue that these small effects should be taken seriously because large parts of society are exposed to violent media, the effects accumulate over time, and the potential consequences are severe. Other researchers disagree with this interpretation, and argue that the effect of media violence on aggression is so small that it is basically negligible, and certainly not a risk to public health (Ferguson & Kilburn, 2009; 2010). These researchers see the small and positive effect size found in meta-analyses as “probably too liberal” (Ferguson & Kilburn, 2010, p. 176), because studies do not usually take into account risk factors of “real importance” (such as family, peer, and parental influences).

In this polarized debate, it is difficult to know who is right and who is not. Both “camps” have valid arguments and scientific papers readily available to support their case (Valkenburg, in press). By now, it is almost as if two parallel fields of media violence

research have emerged – one supporting effects, the other criticizing them. It is up to the reader (whether the reader is a parent, health care professional, journalist, or academic) to decide which side to accept: either media violence leads to aggression, or it does not.

However, there is a third perspective that has been relatively absent from this debate until now: a differential susceptibility perspective (Valkenburg & Peter, 2013a, 2013b). Researchers from this perspective interpret the small effects commonly found in media violence research to mean that media violence does not influence aggressive behavior for all users in the same way. Instead, some adolescents may react strongly to violent media content, whereas others may not (or less strongly so). Differences in developmental level, disposition, and social environment can help explain who is more likely to be affected (Valkenburg & Peter, 2013a). Most media effects studies (as well as meta-analyses) do not take into account such individual differences but instead investigate average effects across entire study samples (Valkenburg & Peter, 2013b; Valkenburg, in press). Although an average effect is an accessible way to see what is going on for *most* people, it does not tell the whole story. By definition, an average consists of scores that are higher as well as lower. To draw a conclusion about media violence effects for all users based on average effects (whether this conclusion is that media influences *all* or *none* of its users) is an oversimplification as well as a potential misinterpretation of such results (Valkenburg & Peter, 2013a, 2013b). After all, an average effect may hide the possibility that some adolescents are very vulnerable to media violence (and in need of more attention) whereas others (perhaps the majority) are not. Thus, whereas the current debate often focuses on the question “Does media violence lead to aggression?,” it may be more relevant to ask “*For whom* does media violence lead to aggression?” This dissertation aims to answer that question by investigating how adolescents’ social context may make some adolescents more susceptible to media violence.

Investigating which early adolescents are more vulnerable to media violence effects is important for three reasons. First, parents, educators, and health care professionals will be better able to identify and help those teens who are more likely to become aggressive as a result of media violence exposure. At the same time, if other teens are not as likely to experience such adverse effects, this may provide some relief for parents who see that their children enjoy violent media content, but feel torn about whether they should allow it. Second, systematic research exploring individual differences will add a relevant new perspective to the debate about media violence effects, both within and outside academia (Valkenburg, in press). A healthy debate is important, and research in this (or any) domain should certainly *always* be critically assessed for its

theoretical, empirical, and practical relevance. But the current debate becomes even more meaningful when discussants forego the notion that effects should be either large, important, and for everyone, or small, unimportant, and for none. Third, by systematically testing a differential susceptibility perspective, this dissertation provides useful insights for media effects researchers more broadly, as the theoretical questions asked here are also applicable to research on educational, sexual, political, health, and social media content.

For whom does media violence exposure lead to aggression?

The idea that different media users have different reactions to media content is not new. The first media effects studies in the 1930s, the Payne Fund studies, already noted that youth reacted to movies in varying, sometimes even opposite ways (Charters, 1933). A quote by Schramm, Lyle, and Parker (1961, p. 3) beautifully illustrates that researchers were aware early on that media effects are nuanced and subtle:

For some children under some conditions some television is harmful. For other children under the same conditions or for the same children under other conditions it may be beneficial. For most children under most conditions, most television is probably neither particularly harmful nor particularly beneficial. This may seem unduly cautious, or full of weasel words, or, perhaps, academic gobbledygook to cover up something inherently simple . . . We wish it were. Effects are not that simple.

Throughout the past century, a host of theoretical models has been developed to explain how entertainment media may affect people's beliefs, thoughts, and behavior. Most of these models acknowledge the complex nature of media effects and that they may be stronger for some than for others as a result of "individual differences" in personality or social context (General Aggression Model, Anderson & Bushman, 2002; Social Cognitive Theory, Bandura, 1986; Cultivation Theory, Gerbner, Gross, Morgan, & Signorielli, 1980; Reinforcing Spirals Model, Slater, 2007; Differential Susceptibility to Media Effects Model, Valkenburg & Peter, 2013a). Today, it is safe to say that most theoretical models and academics agree that media effects are not the same for everyone.

Although this *for whom?* question has been asked for decades, surprisingly, there is not a wealth of empirical studies that attempt to answer it. Media violence researchers certainly acknowledge that media violence is not the only factor that influences people's aggressive thoughts and behaviors (see, for example, Bushman & Anderson, 2015),

and that biological disposition, personality, and social context play an important role too (e.g., Bushman, 1995; Elson & Ferguson, 2014b; Slater, Henry, Swaim, & Cardador, 2004). In most empirical studies, however, these individual differences are controlled for. In other words, they are treated as background noise that should be cancelled out in order to see the “true” or “clean” relationship between media violence and aggression (Oliver & Krakowiak, 2009; Valkenburg & Peter, 2013b). Other studies treat individual difference variables as additional risk factors next to media violence (e.g., Exelmans, Custers, & Van den Bulck, 2015; Ferguson, San Miguel, & Hartley, 2009). The goal in these studies is to investigate whether violent media contributes to youth’s aggression *over and above* the effect of these risk factors – in other words, whether media violence has a meaningful additional influence on aggressive behavior.

By treating individual difference variables as control variables or risk factors, the existing body of research has provided relevant insights into the general relationship between media violence and aggression. However, controlling for or comparing the effect of media violence to the effects of individual difference variables still implicitly assumes that an effect of violent media is only true or meaningful when it holds for all media users. In other words, essentially it still treats media violence effects as a “yes or no”-question, but that may be “too broad a brush stroke” (Slater, 2015, p. 378). In order to advance our understanding of media violence effects, including its subtleties and nuances, we need empirical research that *conceptualizes and tests* the complex interrelations among media violence and individual difference variables. Such research would not only match more closely with predictions made by theoretical models but also fit better with how we experience media effects in real life (that is, simply not for everyone to the same extent).

The most recent theoretical model that conceptualizes these interrelations among individual difference variables and media use is the Differential Susceptibility to Media Effects Model (DSMM, Valkenburg & Peter, 2013a). The DSMM distinguishes three types of individual differences: (1) developmental susceptibility factors such as age and emotional or cognitive developmental level; (2) dispositional susceptibility factors such as pre-existing traits and cognitions; and (3) social susceptibility factors, such as family, parents, and peers. In addition, the DSMM details how each of these individual difference variables can play a role in media effects. For example, they can predict media use directly, but they can also strengthen media effects, such as when there is a match between type of media content used by children and their social context (context-content convergence).

Of the three types of individual differences, social susceptibility variables have received the least attention in both the broader media effects literature and media

violence research specifically (but see Slater et al., 2004; Wallenius & Punamaki, 2008; Yang & Bushman, 2014). Traditionally, the roles of family, parents, and peers have been studied outside communication science. This lack of attention for the role of the context of children's lives in media effects is surprising, given that media use does not take place in a social vacuum (Jordan, 2004). Rather, parents and peers can shape both children's media use and their behavior, and by doing so may have an important role in explaining which children are more likely to become aggressive as a result of media violence exposure, and which children are not. This dissertation therefore conceptualizes and tests the roles of family, parents, and peers in media violence effects, in order to disentangle the complex ways in which media violence may be related to aggression among adolescents in different social contexts.

Outline of this dissertation

This dissertation presents the results of five empirical studies into the relationship between media violence exposure and early adolescents' aggression. Each study is presented in a separate chapter with its own abstract, theoretical background, method, results, and conclusion. The studies are published, in press, or submitted for publication. All studies investigate the media violence-aggression relationship using longitudinal survey data of Dutch teens between 10 and 14 years old. These teens answered questions about their exposure to violence on television and in games, and how often they engage in direct physical or verbal aggressive behaviors against other adolescents (such as hitting, kicking, or calling names). In addition, they answered questions about conflict in their family (chapters 3 and 6), parental mediation of their media use (chapter 4), and perceived peer norms about aggression (chapter 5). By asking questions about these variables at two points in time, we could investigate whether adolescents' aggressive behavior *changed* over time as a result of media violence exposure – and whether this change was more or less pronounced for adolescents in particular social contexts.

Each chapter answers a different question related to media violence exposure and aggression. The first empirical study reported in **chapter 2** focuses on an important requirement in survey research that relies on self-reported answers, which is that the questions used to measure key variables should be reliable (do the questions result in similar answers when they are asked again?) and valid (do the questions actually measure what they should be measuring?). Media violence research has been criticized for using unreliable and invalid measures (Elson & Ferguson, 2014b). Because they result in more error, unreliable measures can make it more difficult to detect effects, which means that the small effects of media violence on aggression typically found

in the empirical literature may also be due to unreliable measurement. For the main outcome variable in this dissertation, aggressive behavior, a self-report scale was already available that had been positively evaluated among adolescents (the Direct and Indirect Aggression Scale, Björkqvist, Lagerspetz, & Kaukiainen, 1992). More surprisingly – given the long history of this field – no such information was available for self-report measures of exposure to violence in television and games. Therefore, the aim of the study in chapter 2 was to evaluate the reliability and validity of the most common self-report measures of media violence exposure in an early adolescent sample. The measure that was evaluated best in this study was used in the subsequent chapters in this dissertation.

Chapters 3 through 6 each investigate the role of a social susceptibility factor in the media violence-aggression relationship. An important context in which early adolescents spend much time (also while using media) is the family, which can be a positive but also a negative environment. **Chapter 3** focuses on the role of family conflict, defined as openly expressed anger, hostility, and aggression in the home (Moos & Moos, 1994), and asks whether adolescents in high conflict families are more vulnerable to media violence effects on aggression than those in low conflict families. Adolescents who observe aggression both in their family and in the media may experience a “double dose” (Gerbner et al., 1980, p. 20), and as a result show a stronger increase in aggression. This chapter provides a formal test of the theoretical concept of “context-content convergence” (Valkenburg & Peter, 2013a, p. 234) between adolescents’ social context and the content of their media entertainment (also known as “resonance” in Cultivation Theory, Gerbner et al., 1980).

Chapter 4 explores not only how negative aspects of a family environment may increase media violence effects on aggression, but also how positive aspects may decrease them. This chapter considers the role of parental media mediation and the different styles in which such mediation is communicated to adolescents. Parents generally have two strategies to manage their children’s media use and try to prevent adverse effects: (1) restrictive mediation, meaning that they restrict or regulate their children’s violent media use, or (2) active mediation, meaning that they discuss violent content with their children in an attempt to make them more critical of such content (Nikken & Jansz, 2006; Valkenburg, Krmar, Peeters, & Marseille, 1999). Recent work has proposed that it is not *how often* parents restrict or actively mediate their child’s media use that matters, but rather *in which style* (Valkenburg, Piotrowski, Hermanns, & de Leeuw, 2013). Like general parenting, parental mediation can be communicated in a way that is autonomy-supportive (which is expected to lead to positive outcomes), or in a way that is controlling or inconsistent (which are expected to lead to negative

outcomes). Thus, chapter 4 investigates whether the style of restrictive and active parental mediation may reduce or increase aggression as a result of media violence exposure.

Although the family and parents are important models for children, their influence tends to decline during adolescence, while the influence of peers becomes much more pronounced. **Chapter 5** therefore shifts the attention from the family and parents to peers and investigates how perceived peer norms (adolescents' perceptions about the frequency and approval of aggression in the peer group, Brechwald & Prinstein, 2011) may influence the relationship between media violence and aggression. Based on the theoretical literature, three potential roles were identified and tested. First, perceived peer norms may strengthen the *effect* of media violence on adolescents' aggression, such that adolescents who perceive more aggression among their peers are more affected by media violence exposure (context-content convergence) compared to adolescents who do not perceive aggression among their friends. Second, perceived peer norms themselves may be influenced by media violence exposure and subsequently increase aggressive behavior. In this case, peer norms provide an explanatory pathway *between* media violence and aggression. Third, it is possible that *both* roles are true, and that perceived peer norms are a pathway between media violence and aggression, but only among adolescents who perceive their friends to be more aggressive. By testing multiple potential roles of perceived peer norms (individually as well as simultaneously), this chapter moves beyond the notion of universal and direct effects of media violence exposure, and provides insight into both for whom *and* how media violence and aggression may be related.

In each of these four chapters, media violence exposure is operationalized as time spent with violent media. In other words, these chapters investigate whether adolescents may become more aggressive when they spend *more time* using violent games or violent television programs. This is how nearly all media violence research conceptualizes its independent variable. Yet, when looking more closely at the processes described by different theoretical models, it becomes clear that it is not the time *per se* that is expected to lead to effects on aggression. Instead, playing a violent game or watching a violent television program is expected to induce cognitive, emotional, and excitative *responses*, and it is these responses that are ultimately responsible for aggressive outcomes (Anderson & Bushman, 2002; Valkenburg & Peter, 2013a). Therefore, **chapter 6** moves beyond effects of time spent with violent media, and asks how cognitive, emotional, and excitative responses to violent games are related to aggressive behavior. In addition, this chapter explores whether these responses to violent games are predicted by family conflict, a social susceptibility

factor. Chapter 3 discussed the relationship between (time spent with) violent media and aggression in adolescents from high conflict families. Chapter 6 continues with this idea and investigates whether adolescents growing up in such families may be more vulnerable to violent media *because* they experience stronger responses in response to it. In doing so, chapter 6 attempts to unravel a potential explanatory pathway through which violent games may increase aggression.

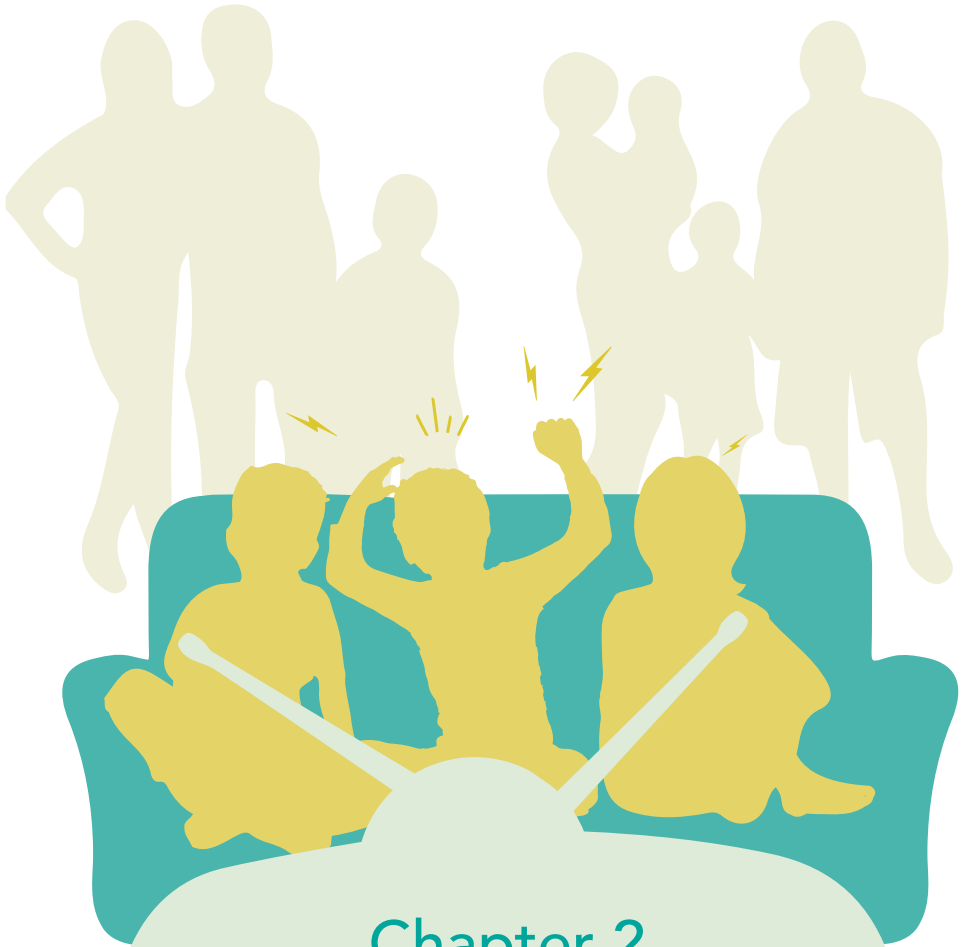
After these five empirical chapters, **chapter 7** summarizes the findings and presents the five main conclusions of this dissertation. Based on these conclusions, two practical take-aways are provided for parents, teachers, and health care professionals who are involved in adolescents' daily life. In addition, this chapter offers several suggestions for media researchers to come closer to understanding the elusive nature of media effects in children's lives.

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Chapter 2

Assessing the reliability
and validity of television
and game violence
exposure measures

ABSTRACT

This study evaluated whether common self-report measures of television and game violence exposure represent reliable and valid measurement tools. Three self-report measures – direct estimates, user-rated favorites, and agency-rated favorites – were assessed in terms of test-retest reliability, criterion validity (their relationship with coded media diaries), and construct validity (their relationship with aggression and gender). A total of 238 adolescents participated in a two-wave survey and completed two media diaries. For game violence, the three self-report measures were reliable and valid. For television violence, only direct estimates achieved test-retest reliability and construct validity. Criterion validity could not be established for the television violence measures because the media diary was not a valid criterion for television violence. Our findings indicate that both direct estimates and favorites are valid measures for game violence, whereas for television violence only direct estimates are valid. We conclude with a discussion about ways to further improve upon and reconceptualize media violence exposure measurement.

Assessing the reliability and validity of television and game violence exposure measures

Media violence research has always been characterized by a certain degree of controversy, and even more so in the past decade (Busching et al., 2015; Kirsh, 2012). Although it is true that different studies have found different effect sizes of media violence on aggressive behavior, this range is easily surpassed by the range in *interpretations* of these effect sizes. Some researchers have compared the strength of the effect of media violence on aggression to the effect of smoking on lung cancer (Bushman & Anderson, 2001), while others maintain that media violence does not increase aggression at all (Ferguson, 2009). In this debate, researchers often refer to low quality of measurement as an explanation for small or large effects on aggression (Elson & Ferguson, 2014b; Ferguson & Savage, 2012; Krahé, 2014b). Many media violence studies use traditional self-report measures, which have often been criticized for their low reliability and validity. Yet, little research currently exists that can speak for or against the quality of self-report measures of media violence exposure used in this field. This lack of knowledge hinders a meaningful interpretation of and debate about the influence of media violence on aggressive behavior.

Our ability to detect and interpret effects of media violence exposure directly depends on the reliability and validity of its measurement. Reliability refers to “the extent to which an experiment, test, or any measuring procedure yields the same results on repeated trials” (Carmines & Zeller, 1979, p. 11), while validity pertains to whether a measure actually reflects the concept it is intended to measure (Carmines & Zeller, 1979). The consequences of using measures of low reliability and validity are substantial. Measures of low reliability introduce additional error variance into statistical models, which results in underestimated effect sizes or even null effects (Jordan, Trentacoste, Henderson, Manganello, & Fishbein, 2007; Lee, Hornik, & Hennessy, 2008; Prior, 2009). Low validity, in turn, makes it difficult to interpret any relationships found between an exposure variable and an outcome (Valkenburg & Peter, 2013b).

Remarkably, given the long history of the field, little research has been undertaken to assess the reliability and validity of media violence exposure measures that rely on self-report. Our current knowledge about the quality of existing measures consists mainly of published articles reporting internal consistency statistics of exposure measures, sometimes complemented by test-retest reliability statistics in longitudinal research. Few formal validation studies exist, with the notable exception of a study by Busching et al. (2015), which investigated the reliability and validity of measuring violent game exposure through favorite titles or genres. Although Busching et al.

found that the measures they investigated were reliable and valid indicators of game violence exposure, no such knowledge is available for television violence exposure measures. Systematic evaluation of self-report measures of media violence exposure, both televised and game-based, is necessary in order to assess whether this field can continue with or should reconsider using current self-report measures. In order to enable critical evaluations of past studies, as well as optimal measurement in future research, this study examines and compares the reliability and validity of two of the most common types of self-report measures of exposure to television and game violence: direct estimates and favorites.¹

Direct estimates of television and game violence exposure

Direct estimates measure the frequency and/or duration of participants' average exposure to media violence. For example, Fikkers, Piotrowski, Weeda, Vossen, and Valkenburg (2013) used direct estimates of television and game violence exposure, asking adolescents to report (a) on how many days per week they watch violent television programs [play violent games], and (b) how much time (in hours and minutes) they spend watching violent television programs [playing violent games] on those days. The key advantage of direct estimates is that they are a quick way to obtain an estimate of a person's media exposure. For this reason, many large-scale surveys have incorporated direct estimates (Vandewater & Lee, 2009). However, arriving at a correct estimate requires several cognitive steps to be taken by the participant. Participants have to (a) understand the question and interpret it in the way intended by the researcher, (b) retrieve all relevant information from memory, then (c) integrate all this information into a single answer, and (d) report this answer correctly and truthfully (Robinson & Godbey, 1997; Schwarz & Oyserman, 2001). During this process, the accuracy of the resulting answer may be affected by two factors (Valkenburg & Peter, 2013b). First, cognitive factors (e.g., problems with recall) can affect the precision with which participants are able to recall and report time spent with violent content. This may be especially difficult for younger participants who may not have developed all necessary cognitive skills yet (Ogan, Karakus, & Kursun, 2013). Second, motivational factors (e.g., attraction to violent content) can affect participants' interpretation of what is "violent" and consequently their reporting of exposure to violent media content.

¹ Although the term "direct estimate" could be interpreted as suggesting that favorite titles are an "indirect" measure, we use the term because it is most common in the literature. We do not suggest that the favorites are an "indirect measure."

Although a number of studies have used direct estimates for media violence exposure (Fikkers et al., 2013; Fraser, Padilla-Walker, Coyne, Nelson, & Stockdale, 2012; Graber, Nichols, Lynne, Brooks-Gunn, & Botvin, 2006; Nikkelen et al., 2014; Slater, 2003; Slater, Henry, Swaim, & Cardador, 2004; Wallenius, Punamaki, & Rimpela, 2007; Wallenius & Punamaki, 2008), direct estimates are most often used to measure general exposure to media – irrespective of content. Most of the current knowledge about the reliability and validity of the direct estimates is therefore based on studies validating direct estimates of general exposure to television. These studies consistently show that general direct estimates have sufficient reliability and validity, and although general direct estimates tend to overestimate exposure, they have been shown to correlate moderately with a criterion or “gold standard” measure (e.g., media diaries in which participants report all titles of media they have used on a particular day; Anderson, Field, Collins, Lorch, & Nathan, 1985; Greenberg et al., 2005; Schmitz et al., 2004; Van der Voort & Vooijs, 1990).

Although direct estimates of general media exposure have demonstrated sufficient reliability and validity in previous research (e.g., Anderson et al., 1985; Van der Voort & Vooijs, 1990), it is unclear whether this is also true of direct estimates of *violent* media exposure. Compared to estimating one’s time spent with games or television in general, estimating one’s exposure to violent content in games or on television requires the extra cognitive step of assessing the presence of violent content in those media. Participants not only have to recall when and how long they were playing games or watching television, but also more specifically which kind of content they were consuming at those times, and only report those instances in which content was violent. This brings an additional cognitive task to the answering process that may affect the reliability and validity of the resulting answers. It is therefore necessary to evaluate specifically the reliability and validity of direct estimates of exposure to violence in games and on television.

Favorite titles as measure of media violence exposure

A second common type of media violence exposure measurement is based on participants’ favorite media titles. This approach was developed by Anderson and Dill (2000) to measure exposure to violence in games. Participants are asked to write down their three favorite games, and to indicate for each title (a) how often they play it (never, sometimes, often), and (b) how violent its content is. The favorites have frequently been used to measure exposure to violence both in games and on television (e.g., Coyne, Nelson, Graham-Kevan, Keister, & Grant, 2010; Ferguson, San Miguel, & Hartley, 2009; Gentile, Lynch, Linder, & Walsh, 2004). Measuring media violence via favorite

games or television programs provides a simple solution to the main weakness of the direct estimates. Where direct estimates require that participants recall all instances of media violence exposure, which is cognitively demanding, the favorites only focus on the frequency and violent content of a limited number of favorite media products. Because participants only have to recall how often they play a particular game or see a particular television program, it is more likely that the frequency and content of these favorites are accurately recalled (Schwarz & Oyserman, 2001). However, the potential penalty for this improved recall is that the favorites do not capture all media violence exposure. After all, exposure to violence in non-favorite games or television programs is excluded. In addition, the favorites rely on participants' own interpretation of "violence," meaning that different participants may assign different levels of violent content to the same favorite title.

One solution to the problem associated with using "user-ratings" of violent content is to use existing media rating systems. Instead of asking participants to assess the level of violent content in their favorite media titles ("user-rated favorites"), researchers have also used "agency-rated" favorites. For example, they have used official agency-ratings such as the Entertainment Software Rating Board to determine the level of violence in games and television programs (e.g., Boxer, Huesmann, Bushman, O'Brien, & Mocerri, 2009; Clemente, Espinosa, & Angel Vidal, 2008; Coyne et al., 2010; Ferguson & Olson, 2013; Lenhart et al., 2008). While user-rated favorites are a quicker method, agency-rated favorites ensure that violent content is assessed in the same way across all participants. Although this ensures consistency across study participants, different rating systems themselves differ in what they consider "violent," and this can vary between countries (Price, Palsson, & Gentile, 2014) as well as over time (Gentile, Humphrey, & Walsh, 2005).

Busching et al. (2015) recently compared user-rated and agency-rated favorites as measures of game violence exposure using three longitudinal samples from the United States, Germany, and Singapore. Findings indicated that (a) users and agencies arrive at similar levels of violent content for the same game (inter-rater reliability), (b) there is high agreement between user-rated and agency-rated favorites (convergent validity), and (c) user-rated and agency-rated favorites both show significant positive correlations with aggressive behavior, with slightly higher correlations for the user-rated favorites (construct validity). This study revealed that agency-ratings do not necessarily result in better reliability and validity of the favorites than user-ratings of violent game content, suggesting that both can be used in research.

While Busching et al. (2015) provide useful comparative information on using different types of ratings for video game violence, their study does not provide any

indication as to whether user-ratings and agency-ratings may also be reliable and valid for television violence exposure. Apart from Busching et al., knowledge about the reliability and validity of the favorites remains limited to what research articles report in their method sections (e.g., a test-retest reliability coefficient of $r = .33$, reported by Ferguson, 2011). As such, two questions related to the quality of the user-rated and agency-rated favorites remain unanswered. First, it is unclear to what extent the favorites provide a good indication of media violence exposure. Because of the favorites' specific focus on a limited number of favorite media titles, they may not be representative of total game or television violence exposure. Second, it is unclear whether user-rated and agency-rated favorites are also reliable and valid measures of exposure to violence on television. Therefore, evaluating the reliability and validity of user-rated and agency-rated favorites as an indicator of exposure to violence on television and games is a reasonable next step.

The current study

Although some knowledge exists regarding the reliability and validity of the direct estimates, user-rated favorites, and agency-rated favorites, this knowledge is not yet very systematic. As a result, it is difficult to know the extent to which these instruments are good measures of exposure to violence in different media. In addition, because each of these measures has its own unique weaknesses, it is difficult to establish literature-based a priori expectations about which measure(s) may be superior. Therefore, in this study, we evaluated all three measures against three measurement criteria. Specifically, this study assessed the test-retest reliability, criterion validity, and construct validity of direct estimates, user-rated favorites, and agency-rated favorites as measures of exposure to violence in games and television programs. Given that many studies investigate media violence in child and adolescent samples, our evaluation of these measures was conducted using data from a sample of early adolescents aged 10 to 14.

Test-retest reliability

Test-retest reliability is the extent to which a measure provides similar results when administered again after a period of time (Carmines & Zeller, 1979). It is not expected that re-administrations produce the exact same result, but rather that their results are consistent (i.e., a participant who has a high media violence exposure score at Time 1 is also expected to have a high media violence score at Time 2). Although it has been argued that assessing test-retest reliability for media violence exposure measures is less appropriate because exposure may vary over time (Busching et al., 2015), it is relevant to describe the extent of this variability. Given that (a) more variability will

result in lower test-retest reliability, and (b) reliability is a prerequisite for validity, information about a measure's (lack of) variability is important for the interpretation of validation results. Therefore, the first step in this validation study was to assess the test-retest reliability of direct estimates, user-rated favorites, and agency-rated favorites by investigating the test-retest correlation between two administrations of these measures over a four-month period.

Criterion validity

Criterion validity is established by comparing the scores obtained with one measure to scores obtained with an already validated measure (the "criterion"; Schutt, 2012). The higher the correlation with a criterion, the more confidence we can have that the to-be-validated instrument measures what it is supposed to measure. Generally, media diaries tend to be seen as a "gold standard" in media research (Jordan et al., 2007; Juster & Stafford, 1991; Schmitz et al., 2004). Media diaries are one of the most elaborate measures of media exposure, measuring all titles of media products (e.g., games, television shows) used on a particular day, which are then coded for specific media content (e.g., violent content, see Bickham & Rich, 2006). The strength of media diaries lies in two elements that are known to improve recall. First, media diaries capitalize on the autobiographical structure of our memory. By encouraging participants to think about their day, a rich network of associations is activated, which increases the likelihood that individual episodes of media use are retrieved (Schwarz & Oyserman, 2001). Second, because media diaries tend to be filled out on the day itself or the day after, this short and recent reference period improves the likelihood of accurate recall (Schwarz & Oyserman, 2001). Indeed, a classic study by Anderson et al. (1985), in which parents kept media diaries of their child's general television exposure, showed that media diaries have both high reliability (one-month test-retest reliability: $r = .72$) and high criterion validity (when correlated with video-observation: $r = .84$). Therefore, media diaries are frequently used as a criterion measure in validation studies (e.g., Greenberg et al., 2005; Özmert, Toyran, & Yurdakök, 2002; Schmitz et al., 2004; Van der Voort & Vooijs, 1990).

In media violence research, media diaries have not often been used as an exposure measure. This is mainly due to practical considerations: Using media diaries is not only expensive but it also places a high burden on both participants and researchers. Research projects often lack the time or resources for measuring media violence exposure through media diaries, and instead opt for shorter self-report measures. Indeed, when examining the empirical literature, media diaries have most often been used as a measure of general television exposure and not often for other types of media

such as games or for violent content in television or games (but see Bickham & Rich, 2006). However, because media diaries are expected to be more reliable than short self-report measures due to their recall-improving characteristics, it is reasonable to expect that media diaries can also serve as a criterion measure for exposure to violent content on television and in games. Therefore, the second step in this validation study was to assess the criterion validity of the direct estimates, user-rated favorites, and agency-rated favorites by investigating their correlations with coded media diaries.

Construct validity

Construct validity refers to “the extent to which a particular measure relates to other measures consistent with theoretically derived hypotheses” (Carmines & Zeller, 1979, p. 23). The third step in our validation process was to test theoretically and empirically-based hypotheses in order to establish the construct validity of the direct estimates, user-rated favorites, and agency-rated favorites. First, based on theoretical predictions (e.g., Anderson & Bushman, 2002) as well as meta-analytic evidence (Anderson et al., 2010; Bushman & Huesmann, 2006; Ferguson & Kilburn, 2009; Paik & Comstock, 1994; Sherry, 2001), we expect valid measures of television and game violence exposure to be positively associated with aggressive behavior:

Hypothesis 1 (H1): When measuring game violence exposure, (a) direct estimates, (b) user-rated favorites, and (c) agency-rated favorites will be positively associated with aggressive behavior.

Hypothesis 2 (H2): When measuring television violence exposure, (a) direct estimates, (b) user-rated favorites, and (c) agency-rated favorites will be positively associated with aggressive behavior.

Second, several studies have found that boys are more likely than girls to select violent media exposure (e.g., Boxer et al., 2009; Coyne & Archer, 2005; Olson et al., 2007). Valid measures of game and television violence exposure should reflect this difference. Therefore, we hypothesized that direct estimates, user-rated, and agency-rated favorites would indicate higher game and television violence exposure for boys than for girls:

Hypothesis 3 (H3): When measuring game violence exposure, (a) direct estimates, (b) user-rated favorites, and (c) agency-rated favorites will show more exposure for boys than for girls.

Hypothesis 4 (H4): When measuring television violence exposure, (a) direct estimates, (b) user-rated favorites, and (c) agency-rated favorites will show more exposure for boys than for girls.

METHOD

Participants and procedure

After receiving approval from the sponsoring institution's Institutional Review Board, a large, private survey research institute in the Netherlands (TNS NIPO/Veldkamp) collected the data. Adolescents were recruited through TNS NIPO's existing online panel of approximately 60,000 households that is representative of the Netherlands. Data collection consisted of two waves. The first wave consisted of an online survey in the last week of January 2012 and online media diaries in February 2012. Wave 2 consisted of an online survey in the last week of May 2012.

A total of 499 Dutch early adolescents between the ages of 10 and 14 years participated in both data waves. To be included in this validation study, participants had to have (a) scores on the direct estimates in both data waves, (b) at least one favorite television program and game that could be coded in both data waves, and (c) completed media diaries for one weekday and one weekend day, in order to establish criterion validity. A media diary day was defined as complete when all content on that day could be coded. The final sample consisted of 238 participants who met these three requirements (53.8% sibling pairs; 47.5% girls; age at Time 1: $M = 11.9$ years, $SD = 1.5$ years). All 238 participants were included in all analyses.

Measures of television and game violence exposure

Direct estimates

The direct estimates measured exposure to violent content on television and in electronic games with two items each (four items in total): (1) How often do you watch television programs [play games] that contain violence? and (2) On the days that you watch television programs [play games] that contain violence, how much time do you spend on this per day? Participants were given the following definition of violence: "All violence (for example, fighting and shooting) that living beings (for example, humans and monsters) do to each other." Games referred to all types of games (video games, but also casual games played on mobile phones or websites). Response categories for the first item ranged from 0 (never) to 7 (7 days per week). The second item was an open-ended question, answered by filling in hours and minutes. The two items for

each medium were multiplied to calculate the number of hours per week of violent television and violent game exposure. Adolescents in our sample reported an average of 1.99 hours per week ($SD = 2.64$) of television violence exposure (girls: $M = 1.27$, $SD = 1.53$; boys: $M = 2.63$, $SD = 3.22$). For game violence exposure, participants reported an average of 3.48 hours per week ($SD = 6.64$; girls: $M = 0.60$, $SD = 1.62$; boys: $M = 6.08$, $SD = 8.22$).

Favorites

Participants were asked to write down the titles of their three favorite television programs and games. For each title, they indicated (1) how often they watch this program [play this game], and (2) how much violence the program [game] contains. Participants were given the same definition of violence as used for the direct estimates. Response categories for the frequency item were (1) never or almost never, (2) less than once a week, (3) once or twice a week, (4) three or four times a week, and (5) almost every day or daily. Response categories for the violent content item were (1) no violence, (2) some violence, (3) much violence, and (4) very much violence.

For the calculation of the user-rated favorites, the frequency and violent content items for each title were multiplied with each other; these scores were then averaged to provide an indication of the degree to which participants consume violence on television or in games (if participants had only provided one or two codable titles, we used the score of the one title or the average of the two titles). For television violence, participants reported an average of 5.15 ($SD = 2.20$) on the user-rated favorites (girls: $M = 4.82$, $SD = 1.94$; boys: $M = 5.46$, $SD = 2.39$; observed range = 1-15). For game violence, participants reported an average of 5.85 ($SD = 3.77$) on the user-rated favorites (girls: $M = 3.63$, $SD = 1.34$; boys: $M = 7.85$, $SD = 4.12$; observed range = 1-20).

For the agency-rated favorites, we multiplied the frequency item with agency-ratings of violent content (see Content Coding section), which were then averaged over all titles provided by that participant. For television violence, participants reported an average of 4.87 ($SD = 2.44$) on the agency-rated favorites (girls: $M = 5.15$, $SD = 2.91$; boys: $M = 4.61$, $SD = 1.89$; observed range = 1-15). For game violence, participants reported an average of 6.24 ($SD = 4.13$) on the agency-rated favorites (girls: $M = 4.02$, $SD = 2.01$; boys: $M = 8.25$, $SD = 4.51$; observed range = 1-20).

Criterion validity: Media diaries

Participants filled out online media diaries on one random weekday and one random weekend day in the month of February 2012. Media diaries were filled out in the evening after 8:00 p.m.; participants reported all titles of television programs and

games used in the 24 hours before (except between midnight and 7:00 a.m.). Following common diary practices, all participants received paper-and-pencil versions on which they could write down titles of media products during the day. They could then refer to this document when completing the online diary in the evening. In the online media diaries, participants were first asked whether they had seen any television programs or played any games during each of five specified parts of the day (8:00 p.m. – bedtime; 7:00 a.m. – noon; noon – 3:00 p.m.; 3:00 – 6:00 p.m.; and 6:00 – 8:00 p.m.). When participants answered yes, they were asked for the name of the television program(s) or game(s) that they watched/played during that part of the day. Participants then indicated how long they watched each program or played each game by selecting from a list the 30-minute time intervals (e.g., 6:00-6:30 p.m., 6:30-7:00 p.m., etc.) during which that program or game had been used.

Content coding

The titles provided by the media diaries and the favorites were coded for violent content using two official agency-rating systems. For television programs, the Dutch rating system “Kijkwijzer” (“Viewing guide”) was used (Valkenburg, Beentjes, Nikken, & Tan, 2002). This rating system advises parents about the potential adverse effects of television programs and movies on children. It assigns both an age rating (suitable for all ages / 6+ / 12+ / 16+) and a content rating (contains violence / scary content / sexual content / discrimination / drugs or alcohol abuse / coarse language). For games, the international Pan European Game Information (PEGI; 2012) rating system was used. This system also assigns both an age rating (3+ / 7+ / 12+ / 16+ / 18+), and a content rating, which is the same as in the Kijkwijzer. In both systems, a violent content rating in combination with a higher age rating indicates more severe violent content.

Content coding took place in three steps. First, trained coders coded the television and game titles by looking up their ratings in the online Kijkwijzer and PEGI databases. Second, titles that were not in these online databases were coded by our coders following the official Kijkwijzer/PEGI guidelines. Third, some entries in the media diary consisted of television channels instead of actual titles. For these entries, coders looked in the television guide to see which programs were broadcast at that time on that channel. These programs were then also coded and included in the dataset. For each of these steps, reliability was evaluated by double-coding at least 25% of the unique titles in the dataset. The media diary resulted in a total of 6,760 television entries, of which 92% could be coded, and 3,737 game entries, of which 86% could be coded. At Time 1, the favorites resulted in a total of 1,995 television entries, of which 87% could be coded, and 1,858 game entries, of which 84% could be coded. Coding

reliability was high (Kappa's ranged from .83 to .94).

We calculated television and game violence exposure based on the media diary in three steps. First, we selected all television programs and games with a violent content rating. Then, we summed the number of 30-minute intervals associated with these violent television programs or games, which resulted in a number of hours of violent television/game exposure per diary day. Lastly, in order to arrive at an estimate of exposure in hours per week, we multiplied the violence exposure on the random weekday by 5 and the violence exposure on the random weekend day by 2, and then summed these two outcomes. This resulted in an average television violence exposure of 2.01 hours per week ($SD = 2.77$; girls: $M = 2.14$, $SD = 3.18$; boys: $M = 1.90$, $SD = 2.34$). For game violence exposure, an average of 4.57 hours per week ($SD = 8.42$) was reported by the participants (girls: $M = 1.49$, $SD = 4.47$; boys: $M = 7.36$, $SD = 10.05$).

For the agency-rated favorites, the categories of degree of violent content were kept similar to that of the user-rated favorites. Recall that the user-ratings consisted of the following categories: no / some / much / very much violence. The agency-ratings were mapped onto those categories in the following way: A violent content rating in combination with the lowest age rating (i.e., all ages or 3+) was considered "no violence"; violent content in combination with an age rating of 6+/7+ was considered "some violence"; violent content in combination with 12+ was considered "much violence"; and violent content in combination with 16+ and 18+ was considered "very much violence." These agency-ratings of violent content were multiplied with the frequency rating of the favorites, and then averaged within television and game titles.

Construct validity: Aggressive behavior

Adolescents' direct aggression was measured with six items adapted from the Direct and Indirect Aggression Scale (Björkqvist, Lagerspetz, & Kaukiainen, 1992). This measure has been used in adolescent samples with good reliability and validity (e.g., Hale, VanderValk, Akse, & Meeus, 2008). Adolescents were asked how often in the past six months they had done the following things to another adolescent: (1) call names, (2) push in a rough way, (3) kick or hit, (4) threaten to beat up, (5) fought with, and (6) tripped on purpose. Response categories were (1) never, (2) 1 time in the past 6 months, (3) 2 to 3 times in the past 6 months, (4) about 1 time per month, (5) about 1 time per week, and (6) about every day. Scores were averaged to create scales ($\alpha = .84$), with higher scores indicating greater aggressive behavior. The mean score on aggressive behavior in our sample was 1.52 ($SD = 0.72$).

Analytic approach

The main analyses consisted of three steps. First, test-retest reliability of the direct estimates, user-rated favorites, and agency-rated favorites was assessed by investigating the correlation between scores on the same measure at Time 1 and Time 2. Second, to assess criterion validity, correlations of the direct estimates, user-rated favorites, and agency-rated favorites with the media diary were investigated. Third, for construct validity, we investigated bivariate correlations between the direct estimates, user-rated favorites, and agency-rated favorites and aggressive behavior and gender at Time 1.

Pearson's correlation coefficients were not appropriate in this study for two reasons. First, all variables were non-normally distributed. As can be expected, many early adolescents had (very) low scores for media violence exposure, leading to a skewed distribution with a long tail. Second, approximately half of our sample (53.8%) consisted of sibling pairs, meaning that the assumption of independent observations is violated, which can result in overestimated coefficients. To account for these two characteristics of the data, we calculated Kendall's tau-a correlations in combination with the clustering option in Stata 12. In addition, we present asymmetric 95% confidence intervals for each Kendall's tau coefficient. Kendall's tau is a non-parametric correlation between two ranked variables (Newson, 2002). A positive value of tau represents the probability of agreement between two variables over the probability of disagreement between the same variables. Stata 12 enables a conversion of Kendall's tau into an approximation of Pearson's r using Greiner's relation (Newson, 2002). Although Kendall's tau is the more appropriate coefficient given the non-normal and clustered nature of our data, we also include Pearson's r to aid interpretation of the results.

Interpreting reliability and validity coefficients

In a validation study, the size of a correlation coefficient is an indicator of the extent to which reliability or validity is achieved. Yet, few guidelines exist for the interpretation of the correlation coefficients. To aid interpretation of the Pearson's r coefficients in our study, we relied on the extant literature to establish reasonable guidelines for evaluating measurement reliability and validity. First, we consider a Pearson's r coefficient in the range of .40 or higher to be evidence for test-retest reliability (cf. Dahlberg, Toal, Swahn, & Behrens, 2005, p. 3). Second, we consider a Pearson's r coefficient in the range of .50 or higher to be evidence of criterion validity (cf. Jordan et al., 2007; Van der Voort & Vooijs, 1990). Third, to achieve construct validity as predicted by H1 to H4, the exposure measures should correlate with aggressive behavior and gender in a way that is consistent with the theoretical and empirical literature. Meta-analyses

show that, in survey research, the average bivariate correlations between aggressive behavior and game violence range between .08 (Ferguson & Kilburn, 2009) and .20 (Anderson et al., 2010; Greitemeyer & Mügge, 2014), and falls in the range of .19 for television violence (Paik & Comstock, 1994; Savage & Yancey, 2008).² Based on these results, we consider construct validity to be achieved when a television/game violence measure shows a positive bivariate correlation with aggressive behavior in that range (H1 and H2).³ Furthermore, related to H3 and H4, we consider construct validity to be achieved when a measure correlates with gender at .40 or higher, with higher violent media exposure for boys than girls (cf. Boxer et al., 2009; Coyne & Archer, 2005; Olson et al., 2007).

2

RESULTS

Game violence exposure

The upper panel of Table 1 presents the correlation coefficients and 95% confidence intervals for the measures of game violence exposure. The direct estimates of game violence exposure achieved test-retest reliability ($\tau = .52, r = .73, p < .001$). For criterion validity, the correlation of the direct estimates with the media diaries came close to, but did not exceed our guideline of .50 ($\tau = .28, r = .43, p < .001$). The two hypotheses related to the direct estimates' construct validity (H1a and H3a) were confirmed: Direct estimates of game violence exposure were positively associated with aggressive behavior and showed more exposure for boys than for girls (aggression: $\tau = .17, r = .27, p < .001$; gender: $\tau = .34, r = .52, p < .001$).

The user-rated game favorites also achieved test-retest reliability ($\tau = .47, r = .67, p < .001$). For criterion validity, the correlation of the user-rated favorites with the media diary also came close to, but did not exceed, our guideline of .50 ($\tau = .29, r = .44, p < .001$). Hypotheses H1b and H3b, related to the construct validity of the user-rated favorites, were confirmed. The associations of the user-rated favorites with

² Although meta-analyses provide an indication of the average effect size in a particular area of research, they are not free from limitations or subjectivity. As discussed by Savage and Yancey (2008), meta-analyses may provide overestimations of effect sizes due to problems such as publication bias, mixed quality of the studies included, problems with statistical reporting, and studies using post hoc comparisons. However, in the absence of other information on average effect sizes in this field, we use the most consistent meta-analytic evidence as indicator for a bivariate relationship between media violence and aggression.

³ As the goal of construct validity is to assess whether one measure correlates with other theoretically relevant variables in the expected direction, we focus on bivariate correlations in this study. Studies that are interested in assessing effects of media violence on aggression or other outcomes would clearly include relevant control variables as a way of ruling out spurious relationships.

aggression and gender were in the expected direction (aggression: $\tau = .18, r = .29, p < .001$; gender: $\tau = .35, r = .52, p < .001$).

The agency-rated game favorites met all guidelines for reliability and validity. This measure of game violence exposure achieved test-retest reliability ($\tau = .52, r = .73, p < .001$) and criterion validity ($\tau = .37, r = .55, p < .001$). Construct validity (H1c and H3c) was confirmed as the associations between agency-rated favorites with aggression and gender were significant and in the expected direction (aggression: $\tau = .15, r = .24, p = .002$; gender: $\tau = .31, r = .47, p < .001$).

Television violence exposure

The lower panel of Table 1 presents the correlation coefficients and 95% confidence intervals for the measures of television violence exposure. The direct estimates of television violence exposure achieved test-retest reliability ($\tau = .34, r = .51, p < .001$). Criterion validity could not be established for the direct estimates of television violence exposure, because its correlation with the media diaries was well below our guideline of a Pearson's r of .50 ($\tau = .11, r = .18, p = .006$). The two hypotheses related to the direct estimates' construct validity (H2a and H4a) were confirmed: Direct estimates of television violence exposure were positively associated with aggressive behavior ($\tau = .19, r = .29, p < .001$), and showed more exposure for boys than for girls ($\tau = .14, r = .21, p < .001$). For gender, the correlation did not meet our guideline of a Pearson's r of .40, but it was significant and in the expected direction.

For the user-rated television favorites, only test-retest reliability could be established ($\tau = .33, r = .50, p < .001$). Neither criterion validity nor construct validity was achieved for this measure. For criterion validity, the correlation between the user-rated favorites and the diary was well below our guideline of a Pearson's r of .50 ($\tau = .08, r = .13, p = .038$). For construct validity, no significant correlation with aggression was found ($\tau = .02, r = .04, p = .575$), thus rejecting H2b. H4b, which hypothesized more exposure for boys than for girls, was confirmed ($\tau = .08, r = .12, p = .040$). However, because the correlation was well below our guideline of .40, we do not consider construct validity with gender achieved for the user-rated television favorites.

For the agency-rated television favorites, too, only test-retest reliability could be established ($\tau = .31, r = .47, p < .001$). Neither criterion validity nor construct validity was achieved for this measure. For criterion validity, the agency-rated television favorites did not meet our guideline of .50 ($\tau = .12, r = .19, p = .002$). For construct validity, no significant correlations with aggression and gender were found (aggression: $\tau = -.07, r = -.11, p = .120$; gender: $\tau = -.00, r = -.00, p = .941$), thus rejecting H2c and H4c.

Table 1 Test-retest reliability, criterion validity, and construct validity of game and television violence exposure measures

Type of measure	Construct validity ^b											
	Test-retest reliability			Criterion validity ^a			Aggression			Gender ^c		
	Tau	95% CI	r	Tau	95% CI	r	Tau	95% CI	r	Tau	95% CI	r
Game violence exposure												
Direct estimates	.52*	[.45; .58]	.73*	.28*	[.19; .37]	.43*	.17*	[.09; .26]	.27*	.34*	[.29; .39]	.52*
User-rated favorites	.47*	[.40; .54]	.67*	.29*	[.21; .37]	.44*	.18*	[.10; .27]	.29*	.35*	[.30; .40]	.52*
Agency-rated favorites	.52*	[.45; .58]	.73*	.37*	[.29; .44]	.55*	.15*	[.06; .24]	.24*	.31*	[.25; .36]	.47*
TV violence exposure												
Direct estimates	.34*	[.26; .42]	.51*	.11*	[.03; .19]	.18*	.19*	[.10; .27]	.29*	.14*	[.06; .20]	.21*
User-rated favorites	.33*	[.25; .41]	.50*	.08*	[.00; .16]	.13*	.02	[-.06; .11]	.04	.08*	[.00; .15]	.12*
Agency-rated favorites	.31*	[.22; .39]	.47*	.12*	[.05; .20]	.19*	-.07	[-.15; .02]	-.11	-.00	[-.09; .08]	-.00

Note. Pearson's *r* was derived from Tau using Greiner's relation in Stata (Newson, 2002).

^a Criterion validity involves the relationship of the self-report measures with coded media diaries.

^b Construct validity involves the relationship of the self-report measures with aggressive behavior and gender.

^c Girls = 0; boys = 1.

* $p < .05$.

Post hoc assessment of the media diary

After completing the main analyses, we opted to conduct a post hoc evaluation of the media diaries for two reasons. First, no studies have used media diaries to measure exposure to violence in games and on television, and thus, our assumption of the media diary as an appropriate criterion for exposure to violent content may be incorrect. And second, in particular, the correlations between the three self-report measures of television violence exposure and the media diaries were remarkably low. Test-retest reliability for the media diaries was assessed by investigating the correlation coefficient between the two media diary days used in this study. Construct validity was assessed in the same way as for the direct estimates, user-rated favorites, and agency-rated favorites, that is, via correlations with aggressive behavior and gender. Table 2 presents the correlation coefficients and 95% confidence intervals for the media diary measures of game and television violence exposure.

For game violence exposure measured with the media diary, test-retest reliability was achieved ($\tau = .30$, $r = .45$, $p < .001$) as was construct validity (aggression: $\tau = .10$, $r = .15$, $p < .001$; gender: $\tau = .23$, $r = .35$, $p < .001$). However, for television violence exposure measured with the media diary, test-retest reliability could not be established ($\tau = -.01$, $r = -.01$, $p = .762$). Construct validity was also not achieved: Television violence exposure measured with the media diary correlated negatively with aggressive behavior ($\tau = -.10$, $r = -.16$, $p = .015$) and did not correlate with gender ($\tau = .01$, $r = .01$, $p = .863$).

Table 2 Test-retest reliability and construct validity of the media diaries

Media diary	Test-retest reliability			Construct validity					
	Tau	95% CI	<i>r</i>	Aggression			Gender ^a		
	Tau	95% CI	<i>r</i>	Tau	95% CI	<i>r</i>	Tau	95% CI	<i>r</i>
Violent game exposure	.30*	[.22; .37]	.45*	.10*	[.01; .18]	.15*	.23*	[.17; .29]	.35*
Violent TV exposure	-.01	[-.07; .05]	-.01	-.10*	[-.19; -.02]	-.16*	.01	[-.07; .08]	.01

Note: Pearson's *r* was derived from Tau using Greiner's relation in Stata (Newson, 2002).

^a Girls = 0; boys = 1.

* $p < .05$.

As the post hoc analysis revealed that the media diary was not a valid criterion measure for television violence exposure, we also assessed the intercorrelations among the three self-report measures as an additional way of assessing their validity. High agreement between the self-report measures suggests that they are measuring the same concept, which is indicative of convergent validity (Busching et al., 2015). For game violence exposure, the direct estimates strongly correlated with the user-rated favorites ($\tau = .55$, $r = .76$, $p < .001$) and the agency-rated favorites ($\tau = .48$, $r = .69$, $p < .001$). The user-rated and agency-rated game favorites were also strongly related to one another ($\tau = .63$, $r = .84$, $p < .001$). For television violence exposure, the direct estimates correlated moderately with the user-rated favorites ($\tau = .37$, $r = .54$, $p < .001$) and low with agency-rated favorites ($\tau = .21$, $r = .33$, $p < .001$). The user-rated and agency-rated television favorites showed high agreement ($\tau = .50$, $r = .70$, $p < .001$).

DISCUSSION

The aim of this study was to evaluate whether three commonly used self-report measures of television and game violence exposure are reliable and valid measurement tools. To this end, we assessed the test-retest reliability, criterion validity, and construct validity of direct estimates, user-rated favorites, and agency-rated favorites as measures of exposure to violence in games and on television in an early adolescent sample.

Game violence exposure

Results indicated that for game violence exposure, all three measures achieved test-retest reliability and construct validity; that is, they showed stability over a four-month period and correlated as expected with aggressive behavior and gender (thereby confirming H1 and H3). Criterion validity (the degree to which the direct estimates and the favorites corresponded with coded media diaries) was highest for the agency-rated favorites. Correlations between the media diaries and direct estimates and user-rated favorites (.43 and .44, respectively) did not exceed our self-established guideline of .50. However, because we considered correlations in range of .50 as sufficient, we also consider these measures as having achieved criterion validity. Furthermore, our post hoc analysis indicated high agreement between the three self-report measures, which also supports these measures' convergent validity. Therefore, we consider each of the direct estimates, user-rated favorites, and agency-rated favorites to be reliable and valid measures of game violence exposure.

Television violence exposure

For television violence exposure, test-retest reliability was achieved for the direct estimates, user-rated favorites, and agency-rated favorites. Construct validity could only be established for the direct estimates (confirming H2a, H4a); neither the user-rated favorites nor the agency-rated favorites achieved construct validity as a measure of television violence exposure (rejecting H2b and c, H4b and c). Criterion validity was not achieved with any of the three measures.

Given these relatively surprising findings for criterion validity, we conducted post hoc analyses of the media diary to ascertain its own test-retest reliability and construct validity. These analyses revealed that the media diary could not be considered a reliable and valid measure of television violence exposure in this study. Consequently, comparing the direct estimates, user-rated favorites, and agency-rated favorites to the media diary is not a valid way of assessing criterion validity for television violence exposure measures in this study. Therefore, only the results for test-retest reliability and construct validity can be used to evaluate the three self-report measures. The findings of these analyses show that only the direct estimates are a reliable and valid measure of television violence exposure. Based on the lack of construct validity for both the user-rated and agency-rated favorites, combined with the lower correlations of the user-rated and agency-rated favorites with the direct estimates, we cannot consider either favorites measure to be a valid measure of television violence exposure.

Implications for using current media violence measures in future research

Our study findings provide three relevant implications for researchers who are thinking about using direct estimates, favorites, or media diaries in their own work. First, our study indicates that media diaries may not be a “gold standard” measure when it comes to measuring exposure to specific content on television. The highly specific nature of media diaries – that is, the practice of filling out media diaries on one or two specific days – may render it particularly susceptible to the day-to-day variation that is inherent to media use (cf. Jordan et al., 2007). In other words, using a media diary on one or two specific days may not be representative of the television content that a person is exposed to on average. Instead, it seems more appropriate to use media diaries as a measure of time spent with television in general, irrespective of content.

Second, our findings revealed that the violence exposure measures used in this study (including the media diary) consistently worked better for games than for television. Although several differences in the nature of television and game use may be put forward to explain this pattern, our data suggest that the most likely reason is a

higher variability in television viewing versus game playing. In our study, for example, adolescents reported almost twice as many television titles compared to game titles in their media diaries. Moreover, television violence exposure was not very common in our sample of typically developing early adolescents (ca. two hours per week on average). This combination of high variability of television viewing and low frequency of violent content means that using media diaries on two days decreases the chance that certain programs (such as violent programs) are captured. This may explain why the media diaries and favorites worked less well in our study as measures of television violence exposure than as measures of game violence exposure. Future validation research may investigate whether measurement reliability can be enhanced by increasing the number of diary days or favorite titles reported, under the assumption that a larger number is more representative of total television violence exposure. Furthermore, our findings point to the importance of conducting validation studies when adapting measurement tools. The favorites measure, for example, was originally developed as a measure of game violence exposure (Anderson & Dill, 2000). The results presented here and elsewhere (Busching et al., 2015) support the reliability and validity of this measure for violent game exposure. However, our results do not support the use of favorites for measuring television violence exposure. This suggests that researchers should be cautious when applying a measurement approach designed for one medium to other types of media. Differences between media may affect measurement in unanticipated ways, making the assumption that one measure will also work for other media a hazardous one.

Third, our results support the conclusion by Busching et al. (2015) that both user-ratings and agency-ratings are reliable and valid ways of assessing the level of violence in games. From a utility perspective, this indicates that researchers need not spend the time and resources on having titles content-analyzed, at least not for general violent content in games. Interesting next steps would be to investigate whether user-ratings of more specific types of media violence, such as indirect aggression, are also reliable and valid indicators. The ability to use viewer interpretations, especially for concepts that are difficult to content-code, would provide a range of new opportunities for media violence research. For violent content in television programs, our findings indicate that neither user-rated nor agency-rated favorites were valid. However, it is important to note that although these measures were not found valid, our study cannot conclude whether this is a consequence of the *ratings* being invalid. It is possible that the television favorites were invalid because the low number of favorites used was not representative of exposure to violent television content, and not because users or agencies incorrectly assessed the violent content in those favorite television shows.

Before fully rejecting user-ratings and agency-ratings of television content, future research should compare different types of raters for violent television content to more fully assess the suitability of user-ratings or agency-ratings in television research.

Moving forward: Reconsidering media violence exposure measurement

Although our study shows that direct estimates (for television and game violence exposure) and user-rated and agency-rated favorites (for game violence exposure) are reliable and valid exposure measures, the modest reliability and validity coefficients obtained in this study indicate that there is room for improvement. It seems that the field of media violence research has reached an important crossroad. On the one hand, our study suggests that we may continue using direct estimates and favorites and accept that, as “reasonably valid” ways of capturing media violence exposure, they are good enough. Or, we can make an effort to advance the field through collective “disciplinary self-reflection” about how we measure media violence exposure (Valkenburg & Peter, 2013b). In our view, this self-reflection is critical, and should consider several aspects of the measurement process, such as the conceptualization of media violence exposure, the evaluation of media exposure measures, and anticipating challenges of self-report measures.

Conceptualizing media violence exposure

An important first step towards improving media violence exposure measurement is to think more carefully about what we consider “media violence exposure.” Remarkably, this question has received little attention. Although definitions of “violent media” have been put forward (e.g., media “that depict intentional attempts by individuals to inflict harm on others,” Anderson & Bushman, 2001, p. 354), these definitions lack precision about the type of violence we are interested in and ignore the issue of what exposure to such content is. A clearer conceptualization of media violence exposure will not only help us understand whether our current measures are capturing what we want to measure (Allen, 1981; Clarke & Kline, 1974), but will also encourage researchers to be more precise in their theoretical predictions about media violence (Jordan et al., 2007; Slater, 2004).

There are two ways in which we can improve our thinking about media violence exposure. First, we should consider the fundamental question of what is exposure to media violence. Looking at the current stock of media violence exposure measures, we see that exposure is operationalized as frequency, or “how often” people are exposed to violent content, in most exposure measures (including the favorites). Yet, frequency measures are unlikely to fully capture a media exposure experience. Consider the

difference between two adolescents, both of whom play violent games every day of the week, but while one plays the game for only five minutes at a time, the other plays for two hours each day. Although the frequency of exposure is the same, these media experiences are likely to be different due to their differences in *duration*. On the one hand, differences in duration may reflect different motivations for using such content (e.g., ritualized media use – playing a game to pass the time waiting for a bus – versus instrumental use – satisfying more intrinsic needs and motivations; cf. Przybylski, Rigby, & Ryan, 2010; Rubin, 2009). On the other hand, this duration difference likely influences how the user cognitively, affectively, and physiologically responds to the content (e.g., Krcmar & Lachlan, 2009), which is hypothesized to be a mediating route to media effects (e.g., General Aggression Model, Anderson & Bushman, 2002; Differential Susceptibility to Media Effects Model, Valkenburg & Peter, 2013a). Yet, despite the added value of assessing both frequency and duration, few self-report measures take into account both aspects of exposure (with the exception of the direct estimates). As a field, it is important to think about what it is that we want to measure in terms of “exposure” to violent content, and whether measures that favor frequency of media violence exposure, duration, or both, are best able to capture this.

That said, we also should take the concept of “exposure” one step further and consider whether measuring “time spent” with media violence is sufficient. Such measures only focus on capturing “encounters” with media violence, but not whether media violence was actually attended to (cf. Potter, 2008; Slater, 2004). The implicit assumption that time spent with media violence (frequency, duration, or both) equates with actual attention and cognitive effort to such content may be problematic in an environment where media multitasking is increasingly common (Rideout, Foehr, & Roberts, 2010). Researchers have argued that the *kind* of exposure, rather than the degree of it, may be what matters (e.g., automatic, attentive, or transported exposure, Potter, 2008; Valkenburg & Peter, 2013a). Relevant future research should reflect on the concept of media violence exposure as well as try to identify the best ways of capturing such exposure.

In addition to reconsidering how we define exposure, we should also be more specific about the kind of violent content in media that we are interested in. Currently, our self-report measures are characterized by a simplified view of violence by treating such content as present or absent (Ferguson, Garza, Jerabeck, Ramos, & Galindo, 2013). Yet, just like “exposure,” media violence can differ in kind as well as degree (Tamborini, Weber, Bowman, Eden, & Skalski, 2013). Within media effects research, theoretical models such as Social Cognitive Theory (Bandura, 2001) propose that some types of violent content (e.g., rewarded, justified, conducted by attractive perpetrators)

may be more influential than other types of violence (e.g., punished, unjustified). In addition, experimental studies have shown that different types of violence can result in different responses (e.g., Bartsch & Mares, 2014). Similarly, the uses-and-gratifications paradigm would suggest that media users may have preferences for different kinds of violence, perhaps as a result of developmental level (e.g., cartoon or fantasy violence versus more realistic violence; Valkenburg & Cantor, 2000) or disposition (e.g., Greene & Krmar, 2005). Yet, current measures attempt to capture all violent content, instead of focusing on the type(s) of violence that are theoretically relevant. Thus, a second important way to improve media violence exposure measurement is to develop measures that are more sensitive to different types of violence and provide a better match with theoretical expectations about media violence.

Evaluating media exposure measures

Apart from more systematic attention to the conceptualization and operationalization of media violence exposure, if we hope to improve our measurement, we also must put forth evaluation criteria for when a measure is considered reliable and valid. The current lack of such guidelines was a challenge for our study as well as for other researchers who may wish to evaluate their measure before using it. Although a multitude of handbooks exists to define and explain the different types of reliability and validity, it remains unclear as to “how high” a particular coefficient must be before reliability or validity is achieved. In our study, we provided guidelines based on a mix of theoretical and empirical work as a way of providing transparency about how we reached our conclusions. However, these guidelines are neither perfect nor indisputable. For example, we used average effect sizes found in meta-analyses as a guideline for the interpretation of construct validity of the media violence exposure measures. However, meta-analyses have their own limitations associated with publication bias and methodological differences between studies, which may result in overestimation of effect sizes (see Savage & Yancey, 2008). As such, some researchers may feel other guidelines are more appropriate when interpreting correlations between media violence measures and aggression. Moving forward, establishing more standardized guidelines for the evaluation of media exposure measures is critical. Doing so will help to provide more clarity about which measures achieve reliability and validity in which contexts (e.g., age groups, types of media). Moreover, a move toward more standardized use of the measures themselves would facilitate direct comparisons between studies investigating media violence.

In addition to deciding on the guidelines for reliability and validity coefficients, it is vital for future validation research to think about how reliability and validity can be

assessed in the best possible way. For example, each of the three criteria used in this study may be improved in future validation research. First, test-retest reliability coefficients reflect random measurement error as well as change in the behavior over time (Heise, 1969; Lee et al., 2008). Because the variable nature of media use may prevent clear interpretations of test-retest reliability coefficients, relevant future validation research should also assess *stability* of the behavior in addition to the reliability of the measure. Second, our study used media diaries to assess criterion validity but found that this method was not a “gold standard” for television violence exposure. Future validation research should think about what other criterion measures may be used to evaluate short self-report measures. It is possible that there is, in fact, no “gold standard” available. In that case, researchers can assess a measure’s convergent validity by comparing the to-be-validated measure with a range of other existing (and preferably already validated) measures. Third, in this study, we used aggression and gender to assess the exposure measures’ construct validity. However, in a field where researchers passionately disagree about whether media violence is related to aggression at all, it would be advisable to include additional constructs that are theoretically expected to relate to media violence exposure (e.g., sensation seeking).

Anticipating challenges of self-report measures

Of course, no matter how well we conceptualize, operationalize, and evaluate media violence exposure measures, there will always be weaknesses inherent to self-report measures common in this and other fields of communication research. Given the costly and time-consuming nature of many “gold standard” measures (e.g., media diaries, behavioral measures, video observation), the reality is that most media researchers need to rely on self-report measurement. It is therefore paramount that researchers consider the inherent weaknesses of such measures at study onset. For example, an important threat to the validity of self-report studies is that they often rely on single respondents for all variables. This could result in particular response patterns due to mischievous responding or single-responder bias. For example, when relying on user-rated favorites, asking participants to first rate the violent content of their favorite games, and then report on aggressive behavior, may set up demand characteristics that result in spurious effects. Researchers can take several steps to prevent this. First, researchers can triangulate data using multiple respondents (e.g., teens, their parents, and agency-ratings for violent content). Second, when using different respondents is not feasible, researchers can embed the relevant questions in a larger survey as a way of preventing respondents to guess the aim of the study. Third, researchers

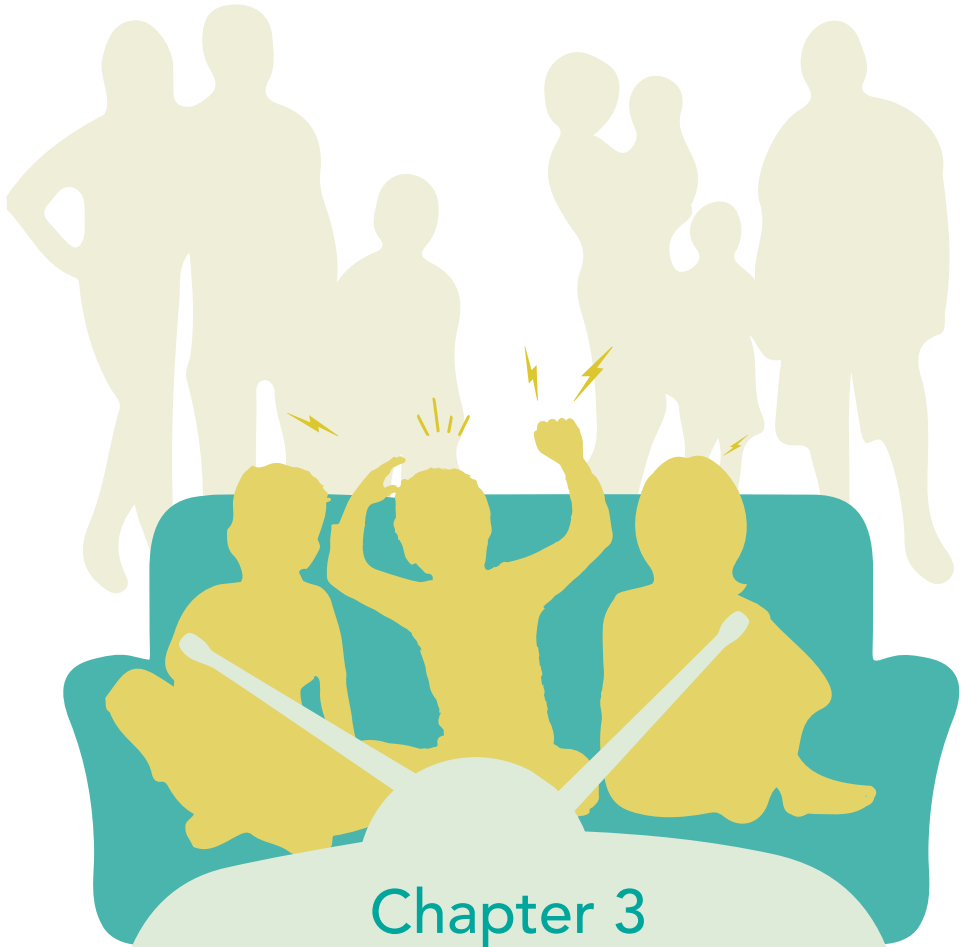
can use multiple measures of media exposure and outcomes. These need not only be the traditional self-report measures. Rather, researchers may also consider turning to newer methods, such as implicit measures (see Hefner, Rothmund, Klimmt, & Gollwitzer, 2011, for a review), as a way of capturing behaviors in a less obvious way. By anticipating the weaknesses of self-report measures, as well as looking for other ways of measuring media violence exposure, media violence researchers can further improve the quality of their future work.

Conclusion

In all, the results of this study support the reliability and validity of direct estimates as a measure of both television and game violence exposure, as well as the reliability and validity of user-rated and agency-rated favorites of game violence exposure. These measures are, therefore, appropriate for use in future media violence studies. However, it is important to recognize that the reliability and validity coefficients for each of these measures were modest, which indicates that there is room for improvement. Ultimately, we believe that the future of this field does not lie in producing more studies using the current stock of measures. Instead, in order to truly move forward, scholars should systematically reflect on several aspects of media violence exposure measurement, such as what we mean by "media violence exposure," when a measure is reliable and valid, and how to anticipate challenges associated with using self-report measures. Such collective self-reflection should result in a better understanding of media violence exposure.

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Chapter 3

Double dose:
High family conflict
enhances the effect of
media violence exposure
on adolescents' aggression

ABSTRACT

We investigated how exposure to media violence and family conflict affects adolescents' subsequent aggressive behavior. We expected a double dose effect, meaning that high media violence exposure would lead to higher levels of aggression for adolescents in high conflict families compared to low conflict families. A total of 499 adolescents (aged 10 to 14, 48% girls) participated in a two-wave longitudinal survey (4-month interval). Survey questions assessed their exposure to violence on television and in electronic games, family conflict, and aggressive behavior. Analyses revealed a significant interaction between media violence and family conflict. In families with higher conflict, higher media violence exposure was related to increased subsequent aggression. This study is the first to show a double dose effect of media violence and family conflict on adolescents' aggression. These findings underscore the important role of the family in shaping the effects of adolescents' media use on their social development.

Double dose: High family conflict enhances the effect of media violence exposure on adolescents' aggression

Media violence exposure has been investigated as a risk factor for aggressive behavior for decades, with most studies demonstrating small to moderate effect sizes (Anderson et al., 2010; Bushman & Huesmann, 2006). Despite the current scientific debate about whether these effect sizes are theoretically and practically meaningful (Valkenburg & Peter, 2013b), such relatively small effects are neither strange nor unexpected. Aggression is a complex behavior caused by multiple factors (Browne & Hamilton-Giachritsis, 2005; Ribeaud & Eisner, 2010) of which media violence is only one. Research investigating the effects of media violence in concert with other predictors of aggression is needed in order to better understand its relative contribution to aggressive behavior (Bandura, 2009; Browne & Hamilton-Giachritsis, 2005).

The debate about whether and how media violence leads to aggression has received renewed attention following the tragic event at Sandy Hook elementary school in December 2012, where 20 children and six teachers lost their lives. In the aftermath of this tragedy, President Obama called for additional funding for research designed to better understand the role that media violence may play in gun violence (White House, 2013). Public policy advocates such as Common Sense Media have indicated that "one of the most pressing needs" in both the public and scientific debate is research that investigates the effects of media violence within the context of the family environment (Common Sense Media, 2013). Indeed, family conflict (defined as openly expressed anger, hostility, and aggression in the home; Moos & Moos, 1994) has been identified as a risk factor for aggressive behavior, particularly during childhood and early adolescence (Ribeaud & Eisner, 2010). Given that aggressive behavior is often conceptualized as the result of a socialization process in which both the family and the media play important roles (Bandura, 1986), investigating how media violence affects aggression within the context of family conflict is relevant (Ferguson, 2009). In this study, we respond to public and academic concerns by investigating the interactive effect of media violence and family conflict on adolescents' aggression.

Research into media violence and family conflict

Although media violence and family conflict have both been investigated as predictors of aggression (Gentile, Coyne, & Walsh, 2011; Krahe & Möller, 2010; Tanaka, Raishevich, & Scarpa, 2010; Vandewater & Lansford, 1998), this has largely taken place in separate disciplines (Vandewater, Lee, & Shim, 2005). Media researchers have focused on the effects of media violence, while largely ignoring effects of family conflict, whereas

the reverse is true for family researchers. Although a few studies have investigated the relative effect of media violence when controlling for family conflict (along with a number of other risk factors; Ferguson, San Miguel, & Hartley, 2009; Huesmann, Moise-Titus, Podolski, & Eron, 2003), it has not yet been investigated whether media violence and family conflict have an interactive effect on aggressive behavior.

This lack of research attention for the joint effect of media violence and family conflict on aggression is surprising. Researchers have long argued that media research should incorporate social context as an integral part of research models rather than treat it as a control variable (Jordan, 2004; Slater, Snyder, & Hayes, 2006). After all, media use does not occur in a social vacuum, but rather takes place within a broader social context that can shape and strengthen its effects (Gerbner, Gross, Morgan, & Signorielli, 1980; Jordan, 2004; Slater et al., 2006). Furthermore, investigating interaction effects between multiple predictors of aggression has been identified as an important goal for media research (Valkenburg & Peter, 2013a). Doing so may show whether the relatively small effects of media violence exposure found on an aggregate level may be larger for a subgroup of children who are particularly vulnerable to the effects of media violence (Valkenburg & Peter, 2013a). By ignoring relevant moderators such as family conflict, the effect of media violence on aggression may be "diluted" across a study sample, potentially resulting in small effects (Valkenburg & Peter, 2013a). To address this gap in the literature, we conducted a longitudinal survey among Dutch adolescents aged 10 to 14 to test whether there is an interactive effect of media violence and family conflict on adolescents' subsequent aggressive behavior.

Theoretical background

Social Cognitive Theory (SCT; Bandura, 1986) has been used to explain the effects of both media violence and family conflict on aggressive behavior (Anderson & Bushman, 2002; Farver, Xu, Eppe, Fernandez, & Schwartz, 2005; Huesmann, 2007; Jordan, 2004; Margolin & Gordis, 2000; McKelvey, Whiteside-Mansell, Bradley, Casey, Connors-Burrow, & Barrett, 2011; Proctor, 2006). SCT states that children learn behaviors through their own experience and through observation of others. Seeing others enact a certain behavior and subsequently being punished or rewarded for this behavior teaches a child which behaviors are socially acceptable and which are not. Such social cognitions are seen as regulators of actual behavior (Huesmann & Guerra, 1997; Orue, Bushman, Calvete, Thomaes, Oriobio de Castro, & Hutteman, 2011; Perry, Perry, & Rasmussen, 1986).

Within this social learning process, the family and the media represent two observable role models for children and early adolescents (Bandura, 1986). Parents, in

particular, are the most important role models for youth (Anderson & Cavallaro, 2002; Bricheno & Thornton, 2007). Through their own actions, parents provide information about acceptable and unacceptable social behavior, which children can then replicate. In the case of aggression, several studies have shown that children who observe conflict within their family display more aggressive behavior themselves (Duncan, Strycker, Duncan, Okut, 2002; Farver et al., 2005; Formoso, Gonzales, & Aiken, 2000; Tanaka et al., 2010).

Given the high amount of time that adolescents spend using media (Rideout, Foehr, & Roberts, 2010), characters and behaviors observed on TV and in games also form a vital part of adolescents' social learning process (Huesmann, 2007; Jordan, 2004). The way in which aggression is often portrayed in these media—glorified, rewarded, and performed by attractive characters (Konijn, Nije Bijvank, & Bushman, 2007)—further increases the chance that adolescents will also display such behavior. Indeed, experimental research has shown that children and adolescents who are exposed to rewarded violence or who identify with aggressive characters subsequently demonstrate increased aggressive behavior (Boyatzis, Matillo, & Nesbitt, 1995; Konijn et al., 2007).

Two theoretical models would predict that observing aggression both in the media and in the family can create a "double dose" effect (Gerbner et al., 1980). Cultivation theory includes the concept of resonance, which is the idea that people whose life experiences are congruent with what they see on television will be more affected by media messages (Gerbner et al., 1980). The Differential Susceptibility to Media Effects Model (Valkenburg & Peter, 2013a) stresses that media effects are often conditional, and that social context can reinforce the effects of exposure to media violence. Based on these theories, we expect that adolescents with high media violence exposure will become more aggressive in the context of high family conflict (double dose effect) than in the context of low family conflict. Thus, we hypothesize that family conflict strengthens the effect of media violence on aggression. Investigating this moderating role of family conflict can help us understand which adolescents are particularly susceptible to the effects of media violence exposure.

METHOD

Participants

After receiving approval from the sponsoring institution's Institutional Review Board, a large, private survey research institute in the Netherlands (TNS NIPO) collected the data. Adolescents were recruited through TNS NIPO's existing online panel (approximately

60,000 households) that is representative of the Netherlands. 673 Dutch adolescents between the ages of 10 and 14 years completed an online survey in January 2012. In May 2012, 499 of these adolescents agreed to participate in a second survey (i.e., 74% recontact agreement). These 499 adolescents made up the sample used in this study (85.8% sibling pairs; 47.9% girls; age at Time 1: $M = 11.87$, $SD = 1.46$).

Measures

Media violence exposure

Media violence exposure was measured using direct estimates, a measure frequently used in media research (Lee, Hornik, & Hennessy, 2008; Schmitz et al., 2004; Vandewater & Lee, 2009). Exposure to violent content on TV and in electronic games was measured with two items each (four items in total): (1) How often do you watch television programs [play games] that contain violence? and (2) On the days that you watch television programs [play games] that contain violence, how much time do you spend on this per day? Participants were given the following definition of violence: "All violence (for example, fighting and shooting) that living beings (for example, humans and monsters) do to each other." Response categories for the first item ranged from 0 (never) to 7 (7 days per week). The second item was an open-ended question, answered by filling in hours and minutes. Items were multiplied to calculate the number of hours per week of violent television and violent game exposure. These two variables were then summed to create one variable representing violent media exposure in hours per week.

Family conflict

Family conflict was measured using five items from the conflict subscale of the Family Environment Scale (Jansma & Coole, 1996; Moos & Moos, 1994). Respondents were asked to indicate how often family members do the following things at home: (1) criticize each other, (2) hit each other, (3) argue, (4) curse, and (5) become so angry they start throwing things. Response categories were (1) never, (2) almost never, (3) sometimes, and (4) often. Scores were averaged to create scales ($\alpha = 0.75$), with higher scores indicating greater family conflict.

Aggression

Adolescents' direct aggression was measured with six items adapted from the Direct and Indirect Aggression Scale (Björkqvist, Lagerspetz, & Kaukianen, 1992). Adolescents were asked how often in the past six months they had done the following things to another adolescent: (1) call names, (2) push in a rough way, (3) kick or hit, (4) threaten to beat up, (5) fought with, and (6) tripped on purpose. Response categories were

(1) never, (2) 1 time in the past 6 months, (3) 2 to 3 times in the past 6 months, (4) about 1 time per month, (5) about 1 time per week, and (6) about every day. Scores were averaged to create scales ($\alpha = .83/.85$ at Time 1/Time 2), with higher scores indicating greater aggressive behavior.

Analytic approach

Because 86% of our sample (428 children) consisted of sibling pairs, ordinary least squares (OLS) regression was inappropriate as the assumption of independent observations is violated. This can result in over- or underestimation of coefficients due to biased estimates of standard errors (Desai & Begg, 2008; Hayes, 2006). To address this clustering in the data, multilevel modeling was used in SPSS 20. Multilevel models take into account that some variables are clustered or nested within other variables (in our case, children were nested within households). We accounted for the correlation among children within a household by allowing the mean aggression score (i.e., the intercept of the regression equation) to vary freely across households. This results in appropriate estimates of the standard errors for the regression coefficients (Desai & Begg, 2008). Parameters in this multilevel model can be interpreted in the same way as OLS regression.

All models controlled for aggressive behavior at Time 1. In addition, we investigated whether gender would be a suitable covariate in our analyses. Because of the relatively short time lag between the data collection waves, as well as the considerable skewness introduced to our data when including gender, we had some concern that the gender-included model would result in incorrect estimates. Given that gender is often included in models investigating media violence and aggression (e.g., Hopf, Huber, Weiss, 2008; Krahe, Busching, & Möller, 2012), we opted to conduct two sets of analyses: one in which gender is omitted from the model, and one in which gender is treated as a covariate. Results from both analyses are reported in the text.

The two-way interaction was probed using the Johnson-Neyman technique (Preacher, Curran, & Bauer, 2006). This technique indicates where (i.e., at which values of a continuous moderator) the effect of an independent variable on a dependent variable is significant (at $p < 0.05$). In this particular study, the Johnson-Neyman technique allows us to identify at which values of family conflict the relationship between media violence and aggressive behavior achieves statistical significance. Although the values obtained for these regions of significance are slightly less stable in multilevel models than in fixed-effects regression, this technique provides valuable information for the interpretation of interaction effects (Bauer & Curran, 2005).

RESULTS

Descriptives and intercorrelations

Table 1 presents the means, standard deviations, and correlations for all model variables. Adolescents in our sample scored relatively low on aggressive behavior, with a mean of 1.52 ($SD = 0.71$, scale range: 1 to 6). Family conflict was also relatively infrequent in the sample, with a reported mean of 2.10 ($SD = 0.55$, scale range: 1 to 4). On average, adolescents reported consuming 4.8 hours per week of media violence ($SD = 8.30$).

Gender correlated significantly with media violence exposure at Time 1 and aggressive behavior at Time 1 and 2. Boys were more aggressive on average than girls (boys: $M = 1.70$, $SD = 0.82$; girls: $M = 1.32$, $SD = 0.51$), and also reported about four times more media violence exposure (boys: $M = 7.60$ hours per week, $SD = 10.47$; girls: $M = 1.80$ hours per week, $SD = 2.71$).

Aggressive behavior was quite stable over time ($r = .55$, $p < 0.001$). Significant correlations were found between media violence and aggressive behavior, both cross-sectionally ($r = .27$, $p < 0.001$) and longitudinally ($r = .18$, $p < 0.001$). Family conflict was also significantly related to aggressive behavior (cross-sectional $r = .36$, $p < 0.001$, longitudinal $r = .30$, $p < 0.001$). The two predictors, family conflict and media violence, correlated at $.11$ ($p = 0.02$).

Table 1 Means (standard deviations) and correlations for model variables

Variables	Means (SD)			Correlations				
	Full sample	Boys	Girls	1	2	3	4	5
1. Aggression T1	1.52 (0.71)	1.70 (0.82)	1.32 (0.51)	-				
2. Media violence T1	4.82 (8.30)	7.60 (10.47)	1.80 (2.71)	.27***	-			
3. Family conflict T1	2.10 (0.55)	2.13 (0.55)	2.07 (0.54)	.36***	.11*	-		
4. Aggression T2	1.46 (0.68)	1.61 (0.77)	1.29 (0.51)	.55***	.18***	.30***	-	
5. Gender ^a	-	-	-	.27***	.35***	.06	.24***	-

^a Girls = 0; boys = 1.

* $p < 0.05$, *** $p < 0.001$.

Main effects of media violence and family conflict

We first investigated the main effect of media violence exposure on aggressive behavior in two steps: first while only controlling for Time 1 aggression, second by adding family conflict to the model. The two predictors (Time 1 media violence exposure and family conflict) and the control variable (Time 1 aggression) were standardized in order to obtain standardized regression coefficients in the multilevel analysis. Standardized regression coefficients (b^*) are presented in the text; unstandardized coefficients are presented in Table 2. For the unstandardized coefficients (b), the predictor variables were centered at their sample mean values to reduce multicollinearity problems with their interaction terms.

Although Time 1 media violence exposure and Time 2 aggression correlated significantly (as shown in Table 1), media violence was not a significant predictor of aggressive behavior when controlling for Time 1 aggression ($b^* = 0.02, p = 0.47$). When family conflict was added to the model, the relationship between media violence and

Table 2 Unstandardized regression coefficients, standard errors, and 95% confidence intervals (CI) predicting Time 2 aggressive behavior

Parameters	Main effects			Two-way interaction		
	b	SE	95% CI	b	SE	95% CI
Regression coefficients (fixed effects)						
Intercept	1.46***	0.03	[1.40; 1.51]	1.45***	0.03	[1.40; 1.50]
Aggression						
Time 1	0.47***	0.04	[0.39; 0.55]	0.46***	0.04	[0.38; 0.54]
MVE	0.00	0.00	[-0.00; 0.01]	0.00	0.00	[-0.00; 0.01]
FC	0.15**	0.05	[0.05; 0.25]	0.14**	0.05	[0.04; 0.24]
MVE * FC	-	-	-	0.01*	0.01	[0.00; 0.03]
Variance components (random effects)						
Random						
intercept	0.04 [†]	0.02	[0.01; 0.12]	0.04 [†]	0.02	[0.01; 0.12]

Note: MVE = Media Violence Exposure; FC = Family Conflict. For ease of readership, Table 2 reflects the analyses without gender.

[†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

aggression was unchanged ($b^* = 0.02, p = 0.48$). Family conflict did predict subsequent aggression ($b^* = 0.08, p = 0.003$), with increased family conflict predicting increased aggression. These results did not change when we added gender to the model as covariate: Media violence was not associated with subsequent aggression ($b^* = -0.00, p = 0.89$) whereas family conflict was ($b^* = 0.08, p = 0.002$).

Interaction between media violence and family conflict

Following main effects testing, we tested our hypothesis that media violence exposure leads to more aggression in the context of high family conflict (i.e., double dose) than in the context of low family conflict. Results supported the double dose effect. There was a significant two-way interaction between media violence and family conflict ($b^* = 0.06, p = 0.01$). The Johnson–Neyman technique indicated that the effect of media violence on aggression was significant only at higher values of family conflict, that is, for scores of 2.44 or higher on the four-point family conflict scale. As shown in Figure 1, high media violence exposure in combination with higher levels of family conflict led to increased aggression—providing evidence for a double dose effect.

The double dose effect was also found when we included gender as covariate in the model. The interaction between media violence and family conflict remained significant ($b^* = 0.06, p = 0.02$). The effect of media violence on aggression was again found for higher levels of family conflict (in this analysis, for scores of 2.95 and higher on the family conflict scale). The Johnson–Neyman technique also indicated a significant effect of media violence on aggression for low family conflict (i.e., scores of 1.37 and lower on a scale ranging from 1 to 4). For low conflict families, the pattern observed was the reverse: Increased media violence was related to decreased aggression. However, we are cautious to interpret this result, as it may reflect an artifact of the data given (a) the conservative nature of the gender-controlled analyses, (b) the limited range of this effect (0.37 data points on the 4-point scale), and (c) the low number of adolescents with high media violence and low family conflict scores ($n = 4$).

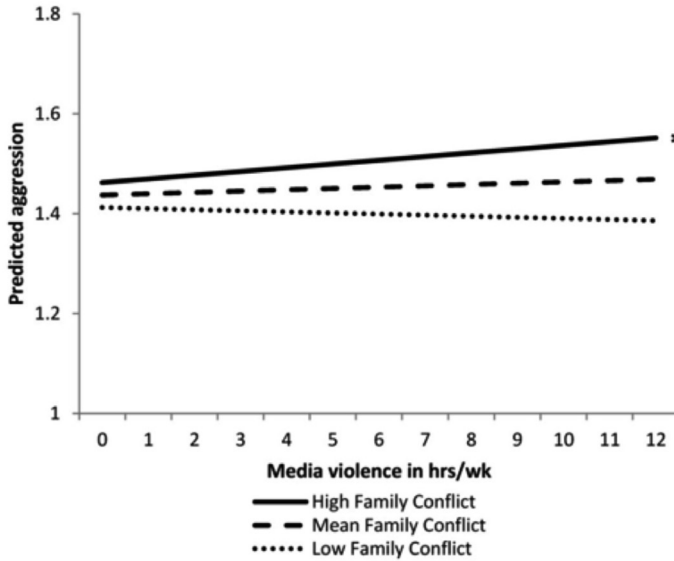


Figure 1 High media violence exposure and high family conflict lead to increased aggression in adolescents (* = significant at $p < 0.05$). Note: low, mean, and high family conflict represent values of 1.76, 2.10, and 2.44 on the family conflict scale.

DISCUSSION

This study investigated the interactive effect of media violence exposure and family conflict on adolescents' aggressive behavior. We found support for the hypothesized double dose effect: Adolescents' aggression increased when they were exposed to both high media violence and high family conflict. This finding provides three important implications for research and practice. First, the presence of a double dose effect is consistent with the idea that not all media consumers are affected by media violence in the same way (Valkenburg & Peter, 2013a). Although many studies have shown main effects of media violence on aggression (e.g., Gentile et al., 2011; Huesmann et al., 2003; Krahe & Möller, 2010), our study shows that media violence exposure may have a stronger effect on adolescents from particular social contexts. By identifying and testing *when* media violence may have a stronger effect on aggression, rather than expecting equal effects for all media consumers, our study contributes to a more nuanced understanding of the effects of media violence. Further research that seeks to investigate other potential moderators of the media violence-aggression relationship would be worthwhile.

Second, our findings highlight the importance of incorporating social context in media research. Adolescents living in higher conflict families showed increased aggressive behavior as a result of higher media violence exposure. One explanation for such a double dose effect is that more frequent experiences with aggression—both directly via family members and indirectly via the media—lead to more accessible aggression-related scripts in adolescents' memory (Farver et al., 2005; Huesmann, 2007). Having more readily accessible aggressive scripts increases the likelihood of using aggressive behavior in social interactions (Lösel, Bliesener, & Bender, 2007). A second way in which frequent exposure to aggression in both the family and the media may lead to increased aggression is via adolescents' social norms. High media violence consumers in high conflict families can learn from two social contexts that aggression is acceptable social behavior (Orue et al., 2011). Such normative beliefs have been shown to predict increased aggression (Henry, Guerra, Huesmann, Tolan, VanAcker, & Eron, 2000; Huesmann & Guerra, 1997; Perry et al., 1986). Finally, a double dose effect may be explained by maladaptive processing of social information. Research has shown that children living in family environments characterized by high levels of negative emotional expression are more likely to experience maladaptive processing styles and subsequent conduct problems (Schultz & Shaw, 2003). Maladaptive processing styles are operationalized as hostile attribution bias (i.e., a tendency to view others' intentions as mean) and maladaptive response generation (i.e., when presented with a negative situation, children generate aggressive response solutions as opposed to more prosocial response options). It may be that children growing up in households with high family conflict and high media violence develop maladaptive processing styles and, as a result, demonstrate increased aggression. Currently, it is unknown which of these three mechanisms—aggressive scripts, normative beliefs, or maladaptive processing—may explain this double dose effect. Research which seeks to identify how a combination of real-life aggression and media aggression leads to increased aggressive behavior in adolescents would advance our understanding of this effect.

Third, our findings provide a starting point for practitioners who work on the prevention or reduction of adolescents' aggressive behavior. Given that family conflict not only predicted aggression individually, but also strengthened the effect of media violence on aggression, it seems reasonable that most ground can be gained by reducing aggression within the family. Family members' aggressive behavior may have a more pronounced influence on adolescents' aggression compared to media violence due to their proximity and emotional closeness to the adolescent (Ferguson, 2009). Helping family members in high conflict families to recognize and change their

norms about acceptable and unacceptable social behavior would be a fruitful first step towards reducing adolescents' aggressive behavior. However, it is important to recognize that changing household norms and reducing family conflict may not always be easy to achieve, particularly in high conflict families. For these families, our results speak to the benefit of reducing media violence as an alternative way of decreasing adolescents' aggressive behavior.

Limitations

It is important to recognize that the effect sizes found in our study were relatively small. In fact, despite a significant bivariate correlation between media violence and aggression, this study did not find a main effect of media violence exposure on aggression—a finding inconsistent with previous research (e.g., Gentile et al., 2011; Huesmann et al., 2003; Krahe & Möller, 2010). Although small effects are not uncommon in media research (Valkenburg & Peter, 2013b), three methodological choices should be taken into account when interpreting our results. First, our choice of media violence exposure measure may have resulted in underestimation of the effect sizes found. This measure asked adolescents to report how often and how long they consume violent TV shows and games during the week. Although such direct estimates have been validated for use among adolescents (Schmitz et al., 2004; Van der Voort & Vooijs, 1990), the estimation procedures involved in these measures can be difficult for adults and adolescents alike, potentially resulting in over- or underestimation of their actual exposure (Robinson & Godbey, 1997). Consequently, the small but significant effect sizes found in our study, as well as the absence of a significant main effect of media violence on aggressive behavior, may be partly due to our choice of media violence measure.

Second, the time lag between waves in our study was relatively short (four months). Since aggressive behavior was quite stable in our study (see the longitudinal correlation between Time 1 and Time 2 aggression in Table 1), this time lag may have been too short to show larger effects of media violence and family conflict on aggression. Third, our sample consisted of typically-developing adolescents who scored relatively low on media violence, family conflict, and aggressive behavior. Because of the restricted range of scores on these variables, the relationships between them may have been attenuated. Still, despite these caveats, we found a double dose effect of media violence and family conflict on adolescents' subsequent aggression, which speaks to the strength of this effect. Future studies may find this effect to be stronger when investigating it in a study with a longer time lag and an at-risk sample in which media violence, family conflict, and aggressive behavior are more frequent. Furthermore,

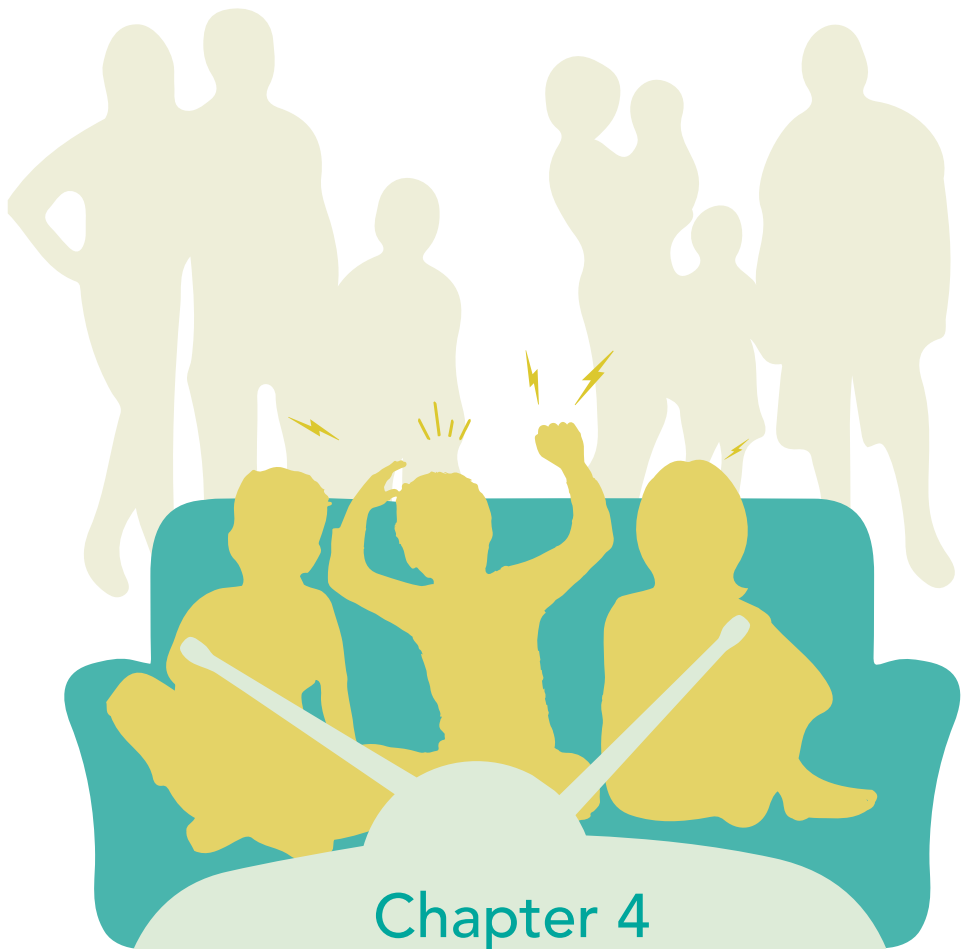
replication of our study using a measure of media violence exposure that relies less on adolescents' estimates of media use across longer periods (such as the Favorites measure by Anderson and Dill, 2000) would be an appropriate next step.

Conclusion

This study is the first to investigate the interactive effect of media violence and family conflict on adolescents' aggression. Results showed that media violence may be a stronger risk factor for adolescents in high conflict families compared to those in low conflict families. Our findings are a first step towards improving the public and scientific understanding of whether and how media violence leads to aggression in the context of other risk factors (Common Sense Media, 2013; Tanaka et al., 2010; Valkenburg & Peter, 2013a). Practically speaking, these findings underscore the important role of the family in the development of early adolescents' social behavior. It is important for parents to realize that their home environment can strengthen the effect of media violence on their child's aggressive behavior. Fostering discussions about what constitutes acceptable social behavior, both in the media and in real life, can be a useful way for parents to mitigate potential negative effects of violent media exposure.

3

This chapter has been submitted for publication.



Chapter 4

A matter of style?
The differential effects of
parental mediation on early
adolescents' media violence
exposure and aggression

ABSTRACT

This study investigated the effects of different styles (autonomy-supportive, controlling, or inconsistent) of restrictive and active parental mediation on adolescents' media violence exposure and aggression. Using data from a two-wave longitudinal survey among 942 adolescents (10 to 14 years; 50.3% girls), results indicate that restrictive mediation communicated in an autonomy-supportive style was cross-sectionally related to decreased media violence exposure and aggression. Alternatively, inconsistent restrictive mediation was cross-sectionally related to increased media violence and aggression. No longitudinal relationships were found for any restrictive mediation styles. Active mediation did not moderate the relationship between media violence exposure and aggression – regardless of the style used. Findings suggest that autonomy-supportive restriction may be an effective route for parents who are concerned about their child's media violence exposure and aggressive behavior.

A matter of style? The differential effects of parental mediation on early adolescents' media violence exposure and aggression

When it comes to adolescents' use of violent television and violent games, many parents are concerned about the potential adverse consequences of such media content on their children's aggressive behavior (Rideout, 2007). Indeed, a number of studies have shown that media violence is positively related to aggression (for a review, see Krahé, 2014a), although there is also research to suggest that no such relationship exists (for a review, see Elson & Ferguson, 2014b). Parents who wish to prevent or reduce the potential negative consequences of media violence exposure often use one of two media mediation strategies: restrictive and active mediation (Nikken & Jansz, 2006; Valkenburg, Krömer, Peeters, & Marseille, 1999). In the case of restrictive mediation, parents establish rules about the time and/or content of media youth can consume. With active mediation, they discuss the acceptability and realism of media violence with their children.

Although research investigating the effectiveness of these two parental mediation strategies provides encouraging results, the evidence as to whether parental mediation may actually reduce aggression as a potential outcome of media violence is both limited and inconsistent. Restrictive mediation effects on aggression have only been found in two survey studies (Gentile, Reimer, Nathanson, Walsh, & Eisenmann, 2014; Nathanson, 1999), but convincing longitudinal evidence is still lacking. Active mediation effects on aggression have been studied in one survey study (Nathanson, 1999) and five experiments (Grusec, 1973; Hicks, 1968; Mattern & Lindholm, 1985; Nathanson & Cantor, 2000; Nathanson, 2004), which together have provided mixed results as to whether active mediation can effectively reduce any relationship between media violence and aggression.

A recently proposed explanation for the inconsistent findings in the parental mediation literature is that research has not considered the *style* in which parental mediation is communicated towards youth (Valkenburg, Piotrowski, Hermanns, & de Leeuw, 2013). The parenting literature indicates that certain parenting styles more successfully promote internalization of values and regulations than other parenting styles (e.g., Darling & Steinberg, 1993; Joussemet, Landry, & Koestner, 2008). For example, autonomy-supportive parenting has been related to successful internalization of regulations and positive child outcomes, whereas controlling and inconsistent parenting styles are related to adverse outcomes (Gardner, 1989; Joussemet et al., 2008). Valkenburg and colleagues argue that parental media mediation (a domain-specific form of parenting) is no different. Here, too, restricting or actively discussing

violent media content could result in children accepting and following parental guidance when communicated in an autonomy-supportive way, but the same strategies may result in no or reverse outcomes when communicated in a controlling or inconsistent way (Valkenburg et al., 2013).

There is currently no evidence to indicate that different styles of restrictive and active mediation are more or less successful in preventing or reducing the potential effects of media violence on adolescents' aggression. Therefore, the aim of this study was to investigate the effectiveness of autonomy-supportive, controlling, and inconsistent styles of restrictive and active mediation in this process. Considering that most of the current research investigating the effects of parental mediation on aggression consists of cross-sectional surveys (Gentile et al., 2014; Nathanson, 1999) or short-term experiments (Grusec, 1973; Hicks, 1968; Mattern & Lindholm, 1985; Nathanson & Cantor, 2000; Nathanson, 2004), it is unclear whether those findings remain over time as well as whether they translate to more naturalistic settings. To address these gaps, we conducted a one-year longitudinal study among 10- to 14-year-old early adolescents to investigate whether the style of parental mediation matters in reducing media violence-induced aggression.

Parental mediation, media violence, and aggression

Restrictive and active mediation are the two most common strategies parents use when it comes to violent television and violent games (Nikken & Jansz, 2006). Both strategies reflect the underlying concern that media violence may increase children's aggressive behavior. Theoretically, media violence has been conceptualized as a modeling influence from which children may learn that aggressive behavior is acceptable, especially when violence in media is rewarded and conducted by attractive characters (Anderson & Bushman, 2002; Bandura, 2009). Meta-analyses show that there is a small positive relationship between media violence exposure and aggressive behavior (Anderson et al., 2010; Ferguson & Kilburn, 2009; Greitemeyer & Mügge, 2014), although researchers differ in their interpretation of these findings (Bushman, Rothstein, & Anderson, 2010; Ferguson & Kilburn, 2010). Still, the main motivation of many parents for mediating their children's violent media use is based on concerns about negative media effects (Nathanson, 2001; Nikken & Jansz, 2006).

Restrictive and active mediation represent two ways of managing the concern that children may learn about aggression from violence on television and in games. Restrictive mediation reflects the assumption that aggression may (at least partly) be reduced or prevented if children are given less or no opportunity to learn from violent media content. Thus, the conceptual role of restrictive mediation is to reduce media

violence exposure, which may subsequently reduce aggressive behavior. Two studies have investigated this relationship. In a cross-sectional survey, Nathanson (1999) showed that restrictive mediation was related to less aggressive tendencies among children. However, this study did not investigate whether children's exposure to violent television mediated this relationship, that is, whether restrictive mediation reduced aggression *via* reduced media violence exposure. Gentile et al. (2014) did investigate this conceptual path in a survey on effects of "parental monitoring" (an amalgam of nine limit-setting items and two active discussion items). The authors found that parental monitoring was cross-sectionally related to reduced media violence exposure, which, in turn, was related to reduced aggression six months later. However, because baseline aggression was not controlled for in this longitudinal analysis, it is difficult to assess whether restrictive mediation at Time 1 actually *reduced* aggression *via* media violence exposure.

Whereas the conceptual role of restrictive mediation is to prevent the learning of aggression from violent media, the conceptual role of active mediation is to influence what children take away from violent media when they do consume it. For example, parents can tell their children that violence in the media is not okay or cool ("evaluative mediation") or emphasize that violence in the media is different than in real life ("factual mediation;" Nathanson, 2004). The (implicit) assumption is that providing a counter culture may help children to become critical consumers of media and that, as a consequence, they will become less susceptible to the potential effects of media violence on aggression (Cantor & Wilson, 2003).

Although several studies have shown that active mediation can indeed change children's perceptions of media violence (e.g., Nathanson & Cantor, 2000; Nathanson, 2004; Rasmussen, 2014), the evidence for a subsequent reduction in aggression is less consistent. Nathanson's (1999) cross-sectional survey reports a negative relationship between active mediation and children's general aggressive tendencies. However, in an experiment in which some children received active mediation and others did not, Nathanson (2004) did not find that aggression was reduced among children who received active mediation. Other experiments only found such reductions in subsamples, such as only among boys (Mattern & Lindholm, 1985; Nathanson & Cantor, 2000), only among 10-year-olds but not 5-year-olds (Grusec, 1973), or only when the experimenter delivering the active mediation was present when observing children's aggression (Hicks, 1968). Thus, it seems that whether active mediation is an effective strategy to decrease media violence-induced aggression is still an open question.

Styles of parental mediation

There are two possible explanations for why the evidence for parental mediation (particularly active mediation) is inconsistent. First, although the existing experiments certainly provide relevant information about whether, with which content, and in which form active mediation may reduce aggressive outcomes in children, they lack ecological validity. Although this is a general limitation of experimental research, it is particularly relevant in the context of parental mediation. At its core, parental mediation is “media-related parenting” (Valkenburg et al., 2013, p. 461), and parenting is a process that takes place in a specific family context and is aimed at children’s long-term internalization of values and regulations (Joussemet et al., 2008). In addition, most psychologists see social behaviors like aggression as a product of long-term socialization processes throughout childhood (Crick & Dodge, 1994). It is perhaps not strange, then, that short-term experiments in which an experimenter delivers an active mediation message are not consistently successful. In order to detect effects of parental mediation on aggression, methods which are sensitive to the social context and prolonged process required for parental mediation are needed.

A second explanation for the inconsistent findings in previous parental mediation research is that these studies have not taken into account the *style* in which the restrictive or active mediation was presented (Valkenburg et al., 2013). The parenting literature has identified different parenting styles that can be more or less successful in supporting children’s socialization. For example, Self-Determination Theory (SDT, Ryan & Deci, 2000) proposes that socialization is more likely to be successful when parents transmit values and regulations in a way that supports the autonomy of the child. Autonomy-supportive parenting involves providing a rationale for parental regulations and recognizing the perspective of the child, and is related to a range of positive child outcomes (Joussemet et al., 2008). Autonomy-supportive parenting is often contrasted with controlling parenting, which involves pressuring children to think and behave in certain ways through for example guilt induction and punishment, and has been related to externalizing and internalizing problems in children (Soenens & Vansteenkiste, 2010). Similarly, inconsistent application of rules by parents has been linked to children’s conduct problems (Gardner, 1989). If parents are sometimes strict and at other times acquiesce to their child, they may “enter a “reinforcement trap” where short-term gains (e.g., peace and quiet) are bought at the cost of strengthening the child’s difficult behavior” (Gardner, 1989, p. 225). In short, different styles of parenting have different effects on internalization of values and regulations by children.

As a domain-specific form of parenting, parental media mediation is no different. Here, too, parents can apply restrictive and active mediation in a way that is autonomy-

supportive, controlling, or inconsistent (Valkenburg et al., 2013). In fact, the style of parenting may matter even more in the realm of media use. For older children and adolescents, media use is part of their personal domain and, as such, parental authority in this domain is increasingly perceived as illegitimate (Smetana, 1995; Valkenburg et al., 2013). As a consequence, if parents attempt to “interfere” in this personal domain, adolescents may experience psychological reactance, a motivational state directed towards restoration of the threatened behavior (Brehm & Brehm, 1981). In order to restore their freedom, teens may engage in the restricted act or increase their liking for the restricted behavior (Dillard & Shen, 2005). In both cases, parental mediation is likely to result in effects opposite to those intended by parents (i.e., boomerang effects). Valkenburg et al. (2013) propose that whereas controlling and inconsistent parental mediation may promote such boomerang effects, autonomy-supportive parental mediation may be a way to circumvent them.

Restrictive mediation styles

Restrictive mediation can be presented in an autonomy-supportive, controlling, or inconsistent style. Autonomy-supportive restriction is defined as posing regulations about time with or content of media while also providing a rationale for these regulations and listening to the child’s perspective (Valkenburg et al., 2013). Although this strategy still involves restricting a child’s media use, the autonomy-supportive style is expected to promote internalization of regulations by the child and circumvent reactance. This would then successfully result in reduced media violence exposure and subsequent aggression. Controlling restrictive mediation is defined as forbidding or restricting media use by getting angry or threatening to punish the child (Valkenburg et al., 2013). Because this is an infringement of the child’s autonomy in a domain in which parental authority may already be questioned, controlling restriction is more likely to result in reactance such that youth may try to reinstate their freedom by doing the forbidden act (i.e., consuming violent media). Lastly, inconsistent restrictive mediation is defined as “parents’ tendency to be erratic and unpredictable in their restriction” of media content or time (Valkenburg et al., 2013, p. 450). Inconsistent restriction teaches a child that he or she can get their way by engaging in conflict with parents about a restricted behavior, which can thwart internalization of regulations on the part of the child (Gardner, 1989). As a consequence, this style of restrictive mediation is more likely to lead to an increase than a decrease in media violence exposure.

Although not investigating different styles specifically, a number of studies support the idea that restrictive mediation may evoke resistance in youth and result in boomerang effects (Byrne & Lee, 2011; Nathanson, 2002; Nije Bijvank, Konijn,

Bushman, & Roelofsma, 2009). Gentile and Walsh (2002) report a negative correlation between consistency of applying parental rules for media and children's general television use, suggesting a boomerang effect of inconsistent restrictive mediation. In addition, Valkenburg et al. (2013) validated their parental mediation scale by showing that the three restrictive mediation styles correlated in the expected directions with aggressive behavior: Autonomy-supportive restriction was cross-sectionally related to less aggressive behavior, whereas controlling and inconsistent restriction both positively correlated with aggression. Similarly, a cross-sectional study by Nikkelen, Vossen, Piotrowski, and Valkenburg (2015) showed that autonomy-supportive restriction correlated with less media violence exposure and inconsistent restriction with more media violence exposure among early adolescents. For controlling restriction, a small negative relationship with media violence exposure was found. In the current study, we extend this body of research on restrictive mediation by investigating both the cross-sectional and longitudinal effects of these three restrictive mediation styles on media violence exposure and subsequent aggression. We pose the following three hypotheses related to restrictive mediation styles (visualized in the upper panel of Figure 1):

Hypothesis 1 (H1): Autonomy-supportive restrictive mediation is related to a decrease in aggression via a decrease in media violence exposure (a) cross-sectionally and (b) longitudinally.

Hypothesis 2 (H2): Controlling restrictive mediation is related to an increase in aggression via an increase in media violence exposure (a) cross-sectionally and (b) longitudinally.

Hypothesis 3 (H3): Inconsistent restrictive mediation is related to an increase in aggression via an increase in media violence exposure (a) cross-sectionally and (b) longitudinally.

Active mediation styles

Active mediation can be communicated by parents in either an autonomy-supportive or a controlling style (inconsistent active mediation, being more or less a *contradictio in terminis*, was not further developed by Valkenburg et al.). The conceptual role of active mediation is to encourage children to take a more critical view of media and thereby reduce its potential negative effects. Thus, what parents attempt to change through active mediation is not the violent media use itself, but rather the perceptions of such

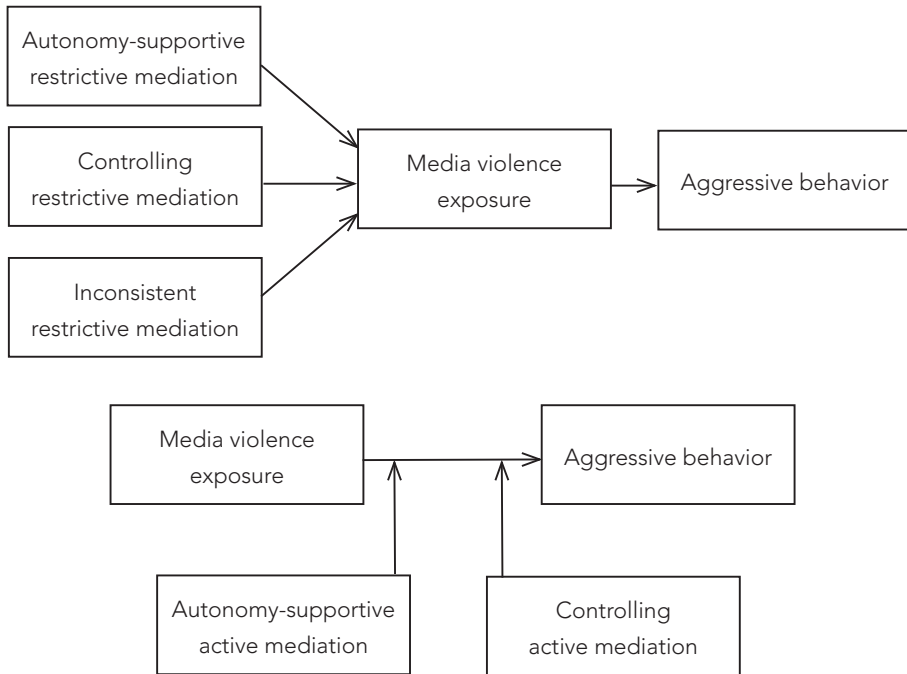


Figure 1 Conceptual models of the different roles of restrictive and active mediation styles in the relationship between media violence exposure and aggression.

media and the behavior on display. The two active mediation styles may affect these learning processes in opposite ways. Autonomy-supportive active mediation is defined as discussions with children about media use in which parents provide rationales for their viewpoints and are open to their child's opinion (Valkenburg et al., 2013). Again, because such a parenting style is more successful in achieving children's socialization (Joussemet et al., 2008), it is likely that autonomy-supportive active mediation will result in children accepting and internalizing these viewpoints. This may then make them less susceptible to the potential effects of media violence on aggression. On the other hand, controlling active mediation (parent-child discussions in which the child's perspective does not count) threatens the child's freedom to have their own thoughts and opinions about violent media. When parents strongly voice their opinion about violent media – a form of entertainment often enjoyed by youth (Jansz, 2005) and a part of their life where parental authority is perceived as illegitimate (Smetana, 1995) – this is more likely to result in reactance. One way in which adolescents can reinstate their

freedom is to like violent media content more (Dillard & Shen, 2005) and see violent media as fun, realistic, and “not that big of a deal.” Given that such perceptions are exactly the theoretical mechanisms proposed to promote effects of media violence on aggression (Bandura, 2009; Carnagey, Anderson, & Bushman, 2007), active mediation that is communicated in a controlling way is likely to result in boomerang effects.

There is little empirical evidence for the role of autonomy-supportive and controlling active mediation as moderators of the media violence-aggression relationship. Of the existing experimental studies into active mediation effects, none have investigated how different styles may moderate a potential relationship between media violence exposure and subsequent aggression. Thus, this study investigated whether autonomy-supportive and controlling active mediation may weaken or strengthen a relationship between media violence and early adolescents’ aggression, cross-sectionally as well as over time. We pose the following two hypotheses related to active mediation styles (visualized in the lower panel of Figure 1):

Hypothesis 4 (H4): Autonomy-supportive active mediation weakens the relationship between media violence exposure and aggressive behavior (a) cross-sectionally and (b) longitudinally.

Hypothesis 5 (H5): Controlling active mediation strengthens the relationship between media violence exposure and aggressive behavior (a) cross-sectionally and (b) longitudinally.

METHOD

Participants and procedure

After receiving approval from the sponsoring institution’s Institutional Review Board, a large, private survey research institute in the Netherlands (TNS NIPO/Veldkamp) collected the data. Families were recruited through TNS NIPO’s existing online panel of approximately 60,000 households that is representative of the Netherlands. All households with at least two children between 10 and 14 (1,565 families in the panel) were invited to participate, of which 516 families participated. Data collection consisted of two waves, and took place in the adolescents’ homes where they filled out a questionnaire on a laptop. The first wave of data collection was conducted between September and December 2012; the second wave was conducted between September and December 2013. Data collection procedures were identical for both

waves. A total of 1,029 early adolescents participated in wave 1, and 942 adolescents participated again in wave 2. These 942 respondents made up the final sample, which consisted of 99.6% sibling pairs; 50.3% girls; mean age at Time 1 = 11.8, $SD = 1.4$ years.

Measures

Parental media mediation

Parental media mediation was measured using the Perceived Parental Media Mediation Scale, which has been found reliable and valid for early adolescent samples (Valkenburg et al., 2013). This scale consists of eight main items that measure the frequency of restrictive and active parental mediation. Each of the four main restrictive mediation items is followed by three follow-up items that measure *how* adolescents' parents restrict their media use: (1) autonomy-supportive restriction (e.g., "My parents explain to me why it's better to not play those games"); (2) controlling restriction (e.g., "My parents would get angry if I still want to play those games"); and (3) inconsistent restriction (e.g., "My parents would say that I am not allowed to play those games, but I know that after a while I can play those games again"). Only the follow-up items were used in this study. Response options for these follow-up items were (1) completely not true, (2) not true, (3) neutral, (4) true, and (5) completely true. Scales were created for each of the three restrictive mediation styles by averaging the four follow-up items for each style. Internal reliability was good for each scale (Cronbach's alpha's: autonomy-supportive restriction = .83; controlling restriction = .74; inconsistent restriction = .79).

Similarly, each of the four main active mediation items is followed by two follow-up items that measure *how* adolescents' parents actively mediate their media use: (1) autonomy-supportive active mediation (e.g., "My parents would encourage me to voice my own opinion"); and (2) controlling active mediation (e.g., "My parents would value their own opinion more than mine"). The same response options were given. Scales were created for each of the two active mediation styles by averaging the four follow-up items for each style. Internal reliability was good for each scale (Cronbach's alpha's: autonomy-supportive active mediation = .82; controlling active mediation = .70). Means and standard deviations are reported in Table 1.

Media violence exposure

Media violence exposure was measured using direct estimates of exposure to television and game violence. This method has been found reliable and valid for use in adolescent samples (Fikkers, Piotrowski, & Valkenburg, 2015). Direct estimates measured exposure to violent content on television and in electronic games with two items each (four items in total): (1) How often do you watch television programs [play

games] that contain violence? and (2) On the days that you watch television programs [play games] that contain violence, how much time do you spend on this per day? Participants were given the following definition of violence: "All violence (for example, fighting and shooting) that living beings (for example, humans and monsters) do to each other." Games referred to all types of games (video games, but also casual games played on mobile phones or websites). Response categories for the first item ranged from 0 (never) to 7 (7 days per week). The second item was an open-ended question, answered by filling in hours and minutes. The two items for each medium were multiplied to calculate the number of hours per week of violent television and violent game exposure. These two variables were then summed to create one variable representing violent media exposure in hours per week. Adolescents reported an average of 5.29 hours per week ($SD = 10.94$) of media violence exposure at Time 1.

Aggressive behavior

Adolescents' direct aggression was measured using eight items from the Direct and Indirect Aggression Scale (Björkqvist, Lagerspetz, & Kaukiainen, 1992). Adolescents were asked how often they do the following things when they are angry with another adolescent: (1) hit, (2) yell at or argue with, (3) kick, (4) swear at, (5) trip, (6) threaten to hurt, (7) push, or (8) fight with another adolescent. Response options were (1) never, (2) almost never, (3) sometimes, (4) often, and (5) very often. These items formed a reliable scale (Cronbach's alpha at both waves = .92). Means and standard deviations for Time 1 and Time 2 are reported in Table 1.

Control variables

We evaluated whether gender, age, parental education, and parental income were relevant control variables. Only gender correlated significantly with aggressive behavior at Time 1 and 2 (see Table 1), and was therefore included as a control variable in all analyses. Gender was coded as girls = 0 and boys = 1.

Analytic approach

Structural equation modeling (SEM) in MPlus (version 7.11, Muthén & Muthén, 2014) was used to test all study hypotheses. Model fit was evaluated by using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). We preferred these measures over the Chi-square statistic, given that this index is often unreliable with large samples. A good model fit is indicated by a CFI larger than 0.95 and an RMSEA smaller than .05. A CFI between 0.90 and 0.95 and an RMSEA between .05 and .08 indicate acceptable model fit (Kline, 2010). Because our sample consisted of

sibling pairs, we accounted for clustering by using the “cluster” option in Mplus to obtain corrected standard errors. Inspection of multivariate outliers using Mahalanobis distance indicated that outliers on the media violence exposure variable were posing problems. To address this problem, media violence was trimmed to 28 hours per week at both Time 1 and Time 2 (changing the values for 3.1% and 5.4% of the sample in Time 1 and 2, respectively). These trimmed variables were used in all analyses (mean and standard deviation are reported in Table 1).

In our cross-sectional analyses, we used all Time 1 variables. Our main dependent variable, aggressive behavior, was positively skewed, which increases the likelihood of making Type I errors when using parametric analyses (Atkins & Gallop, 2007). In order to appropriately model this variable, we compared whether running the SEM models as Zero-Inflated Poisson models (a nonparametric approach) would result in better model fit compared to running the SEM models with the original aggression variable as dependent variable. Using the Bayesian Information Criterion to compare models, model fit was consistently better for the parametric analyses compared to the nonparametric analyses. We therefore used parametric SEM models with the Time 1 aggression variable as dependent variable for all cross-sectional hypotheses.

In our longitudinal analyses, we used aggressive behavior as a change score, which was created by subtracting the Time 1 score from the Time 2 score for each respondent (mean and standard deviation are reported in Table 1). This change score was normally distributed, indicating that parametric analyses were appropriate for all longitudinal hypotheses. In addition, using a change score is statistically equivalent to using aggression at Time 2 as the dependent variable while controlling for aggression at Time 1. Therefore, by using the change score for aggression, our models also took into account the longitudinal nature of our data.

In our longitudinal analyses for hypotheses 1 to 3, in which media violence exposure is conceptualized as a mediator, we also used a change score for media violence exposure. Hypotheses 1 to 3 ask whether restrictive mediation styles can change aggression *through changing* media violence exposure; thus, using a change score for media violence exposure is conceptually appropriate for analyses testing these three hypotheses. We created a change score for media violence exposure by subtracting the Time 1 trimmed score from the Time 2 trimmed score for each respondent (mean and standard deviation are reported in Table 1). In hypotheses 4 and 5, media violence exposure is conceptualized as predictor at Time 1, and therefore included as Time 1 variable both in the cross-sectional and the longitudinal analyses.

RESULTS

Descriptives

Table 1 presents the means, standard deviations, and correlations among study variables. At Time 1, the three restrictive mediation styles correlated with media violence and aggression in the expected directions. Autonomy-supportive restriction correlated negatively with both media violence exposure ($r = -.31, p < .001$) and aggressive behavior ($r = -.15, p < .001$). Inconsistent restriction correlated positively with both media violence exposure ($r = .27, p < .001$) and aggressive behavior ($r = .24, p < .001$). Controlling restriction correlated positively with aggression ($r = .17, p < .001$), but was not significantly related to media violence exposure ($r = .00, p = .926$). For the two active mediation styles, these patterns were similar. Autonomy-supportive active mediation correlated negatively with both media violence ($r = -.15, p < .001$) and aggression ($r = -.13, p < .001$), whereas controlling active mediation correlated significantly with aggression ($r = .14, p < .001$) but not with media violence ($r = -.01, p = .823$). When correlating the parental mediation variables with *change* in media violence and aggression (variables constructed by subtracting the Time 1 score from the Time 2 score), one significant correlation emerged between controlling restrictive mediation and change in aggression ($r = -.07, p = .049$). Media violence exposure correlated significantly with aggression at Time 1 ($r = .36, p < .001$) and with aggression at Time 2 ($r = .33, p < .001$), but not with change in aggression ($r = -.00, p = .957$).

Restrictive mediation styles

Hypotheses 1 to 3 were tested in one structural equation model. In the cross-sectional model, all variables at Time 1 were used, with the three restrictive mediation styles as predictors, media violence exposure as mediator, aggressive behavior as outcome, and gender as control variable. In the longitudinal model, we used change scores for both media violence exposure and aggressive behavior.

Cross-sectional

The hypothesized model had good fit to the data, CFI = 1.00, RMSEA = 0.00. H1a and H3a were supported. Autonomy-supportive restrictive mediation was related to a decrease in aggressive behavior via a decrease in media violence exposure (indirect effect: $b = -.02, SE = .01, p = .005, b^* = -.03$). Inconsistent restrictive mediation was related to an increase in aggressive behavior via an increase in media violence exposure (indirect effect: $b = .02, SE = .01, p = .004, b^* = .02$). H2a was not supported. Controlling restrictive mediation was not significantly related to media violence exposure, so the indirect effect was also not significant ($b = -.00, SE = .00, p = .236, b^* = -.01$).

Table 1 Means, standard deviations, and zero-order correlations among study variables ($n = 942$)

Variable	Mean (SD)	Zero-order correlations ^a												
		1	2	3	4	5	6	7	8	9	10			
1. Restriction: Autonomy-supportive	3.39 (1.01)	--												
2. Restriction: Controlling	1.96 (0.80)	.12*	--											
3. Restriction: Inconsistent	2.07 (0.85)	-.15*	.27*	--										
4. Active mediation: Autonomy-supportive	2.92 (0.91)	.56*	.12*	-.06	--									
5. Active mediation: Controlling	2.47 (0.79)	.13*	.46*	.26*	.09*	--								
6. Media violence exposure T1 ^b	4.60 (6.88)	-.31*	.00	.27*	-.15*	-.01	--							
7. Change in media violence exposure (T2-T1)	1.26 (6.45)	.04	-.00	.01	.02	.02	-.22*	--						
8. Aggressive behavior T1	1.61 (0.69)	-.15*	.17*	.24*	-.13*	.14*	.36*	.04	--					
9. Aggressive behavior T2	1.62 (0.70)	-.14*	.12*	.20*	-.12*	.09*	.33*	.11*	.59*	--				
10. Change in aggressive behavior (T2-T1)	0.01 (0.61)	-.01	-.07*	-.03	-.01	-.04	-.00	.05	-.41*	.45*	--			
11. Gender ^c	-	-.15*	.06*	.10*	-.14*	.06*	.39*	.16*	.34*	.34*	.34*	.01		

Note. All variables are Time 1 variables unless otherwise indicated.

^a Pearson's r correlations, converted from Kendall's tau- a correlations using Greiner's relation in Stata 12 (Newson, 2002).

^b Hours per week, mean of the trimmed variable that was used in the analyses.

^c Girls = 0; boys = 1.

* $p < .05$; † $p < .10$.

Longitudinal

The hypothesized model had good fit to the data, CFI = 1.00, RMSEA = 0.00. The results did not support any of the longitudinal hypotheses (H1b, H2b, H3b). None of the restrictive mediation styles significantly predicted a change in media violence exposure, therefore the indirect effects on change in aggression were also not significant.

Active mediation styles

Hypotheses 4 and 5 were tested in separate structural equation models that included one moderator at a time. In the cross-sectional models, all variables at Time 1 were used, with media violence as predictor, autonomy-supportive or controlling active mediation as moderator, aggressive behavior as outcome, and gender as control variable. In the longitudinal models, we used change scores for aggressive behavior.

Cross-sectional

The hypothesized model with autonomy-supportive active mediation as moderator had acceptable fit to the data, CFI = 0.953, RMSEA = .055. The results did not support H4a. Although media violence exposure was significantly related to aggressive behavior ($b = .12$, $SE = .03$, $p < .001$, $b^* = .18$), the relationship was not moderated by autonomy-supportive active mediation ($b = .02$, $SE = .03$, $p = .429$, $b^* = .03$).

The hypothesized model with controlling active mediation as moderator had good fit to the data, CFI = 1.00, RMSEA = 0.00. The results did not support H5a. The significant cross-sectional relationship between media violence exposure and aggression was not moderated by controlling active mediation ($b = -.00$, $SE = .02$, $p = .980$, $b^* = -.00$).

Longitudinal

The hypothesized model with autonomy-supportive active mediation as moderator had acceptable fit to the data, CFI = 0.908, RMSEA = 0.055. The results did not support H4b. Media violence exposure did not predict change in aggression ($b = -.02$, $SE = .03$, $p = .535$, $b^* = -.03$), and this longitudinal relationship was not moderated by autonomy-supportive active mediation ($b = .00$, $SE = .03$, $p = .979$, $b^* = .00$).

The hypothesized model with controlling active mediation as moderator had good fit to the data, CFI = 1.00, RMSEA = 0.00. The results did not support H5b. Controlling active mediation did not moderate the (non-significant) longitudinal relationship between media violence exposure and change in aggression ($b = .01$, $SE = .02$, $p = .543$, $b^* = .02$).

DISCUSSION

This study investigated the effectiveness of autonomy-supportive, controlling, and inconsistent styles of restrictive and active parental mediation in reducing the potential effect of media violence on early adolescents' aggressive behavior. Based on Self-Determination Theory (Ryan & Deci, 2000; Valkenburg et al., 2013), we expected that autonomy-supportive restrictive mediation would reduce aggression via reduced media violence exposure (H1), whereas controlling and inconsistent restrictive mediation would increase media violence and subsequent aggression (H2, H3). Hypotheses 1 and 3 were supported cross-sectionally but not longitudinally (one year later). Controlling restrictive mediation was not related to media violence exposure, rejecting hypothesis 2. We also expected that autonomy-supportive active mediation weakens (H4) and controlling active mediation strengthens (H5) the relationship between media violence exposure and aggressive behavior. These hypotheses were not supported cross-sectionally or longitudinally.

Restrictive mediation styles

Our findings for restrictive mediation support the idea that the style of parental mediation matters when attempting to reduce media violence exposure and, by extension, potentially reduce aggression. Generally, restriction of media use may evoke reactance among adolescents which can result in boomerang effects (Byrne & Lee, 2011). Our study shows that such boomerang effects may be circumvented when parents restrict media in an autonomy-supportive way. Autonomy-supportive restriction (characterized by providing a rationale for rules and taking the child's perspective seriously) may lead to successful internalization of regulations among adolescents, which was reflected in this study by a cross-sectional reduction of media violence exposure and aggression. On the other hand, boomerang effects did occur when parents restricted their children's media use in an inconsistent way. Restricting violent media use at some occasions while allowing it at others was related to more media violence exposure and aggression in youth. Lastly, controlling restrictive mediation was not related to adolescents' media violence exposure and aggression. It may be that, in some families, controlling restriction is so strict that children simply cannot engage in "boomerang behaviors."

Although autonomy-supportive and inconsistent restrictive mediation were cross-sectionally related to media violence and aggression, neither predicted changes in media violence exposure over the course of a year. While previous research reports only cross-sectional correlations between restrictive mediation and children's media

violence exposure (Gentile et al., 2014; Nathanson, 1999), our study was the first to test whether restrictive mediation also works in the long term. The lack of longitudinal findings suggests that such parenting behaviors do not have long-lasting effects. However, before concluding this, we need additional longitudinal research that further improves upon this study. It is possible that our longitudinal study incorporating two waves of data (one year apart) was not able to capture the potentially dynamic relationship between parents' media regulations and children's media violence exposure. Early adolescence is a developmental period in which children increasingly engage in negotiations with their parents about rules, while parents gradually relax restrictions and allow children more freedom (Davies & Gentile, 2012; Opgenhaffen, Vandenbosch, Eggermont, & Frison, 2012). These developments have two important consequences for studying the longitudinal relationship between restrictive mediation and children's media violence exposure. First, such an effect may only be visible during a shorter time frame, such as a few months, after which adolescents and parents may have jointly negotiated new rules. Second, the relationship may be bidirectional, such that restrictive mediation is a response as well as a precursor of children's media violence exposure (Clark, 2011). After all, parents only need to restrict media violence when their child is interested in it in the first place (and when parents perceive this as problematic). Thus, before concluding whether or not parental mediation has effects over time and in order to further disentangle potential transactional processes, future research should collect multiple measurements from families with adolescents in shorter time lags, for example at three or more occasions during a one-year interval. In addition, qualitative data such as observation studies or interviews would provide more insight in the dynamic process in which parents and youth jointly negotiate family rules for media, as well as the role of different mediation styles in this process.

Active mediation styles

In this study, active mediation styles did not moderate the relationship between media violence exposure and adolescents' aggressive behavior. Autonomy-supportive active mediation did not weaken, nor did controlling active mediation strengthen this relationship. As with restrictive mediation, the absence of longitudinal evidence may be explained by a potential short-term cyclical process not captured by our one-year time lag. However, it is particularly notable that active mediation styles also did not moderate the relationship between media violence and aggression in the cross-sectional analyses. While several studies have shown that active mediation can influence children's *knowledge* about or *attitudes* toward violent television content (e.g., Nathanson & Yang, 2003; Nathanson, 2004; Rasmussen, 2014), our findings – in

combination with the inconsistent active mediation findings from previous research (Grusec, 1973; Hicks, 1968; Mattern & Lindholm, 1985; Nathanson, 1999; Nathanson & Cantor, 2000; Nathanson, 2004) – raise questions about the effectiveness of active mediation as a way to reduce the potential effects of media violence exposure on aggressive *behavior*. Given the persuasive theoretical argumentation underlying active mediation (Cantor & Wilson, 2003), it is somewhat surprising that we do not find similarly persuasive empirical evidence for active mediation as a way to reduce the relationship between media violence and aggression.

On the one hand, perhaps we should be more realistic in what active mediation of violent media can achieve. A recent meta-analysis on the effects of more formal media literacy interventions indicated that such interventions have larger effects on media-relevant outcomes (e.g., knowledge and realism) compared to behavior-relevant outcomes (Jeong, Cho, & Hwang, 2012). The authors suggest that this is a consequence of the fact that media literacy programs directly focus on media-relevant outcomes, but not on subsequent real-life behaviors. The same is true for parental active mediation of violent media. It is not so strange, then, that existing research (Nathanson, 2004) finds that variables that are more closely related to the content of active mediation (knowledge about and attitudes towards media violence) seem to be more strongly affected than more distal outcomes, in this case real-life aggression. Active mediation of violent media may simply be too far removed from aggressive behavior to reduce such a complex social behavior.

On the other hand, several unanswered questions remain that need answering before we can fully understand the intricate and perhaps subtle processes in which active mediation may influence potential media violence effects on aggression. One step forward would be to develop a clearer theoretical framework that can help explain inconsistent previous findings and guide future research (cf. Clark, 2011; Rasmussen, 2013). Such theoretical work should be informed by more fine-grained qualitative research that takes into account family processes as well as individual differences (Nathanson, 2015). Existing research (including this study) has taken a relatively simplified approach to studying the active mediation process, leaving open several questions about why active mediation may or may not work. For example, what is it exactly that children take away from active mediation communicated in different styles? How do they internalize such messages and integrate them with the messages they may receive from important others such as their peers? Furthermore, no research has investigated the role of “dosage” of active mediation. Do parents need to actively mediate every time their children use violent media, or is that exactly the type of parental behavior that encourages reactance? Lastly, is active mediation perhaps

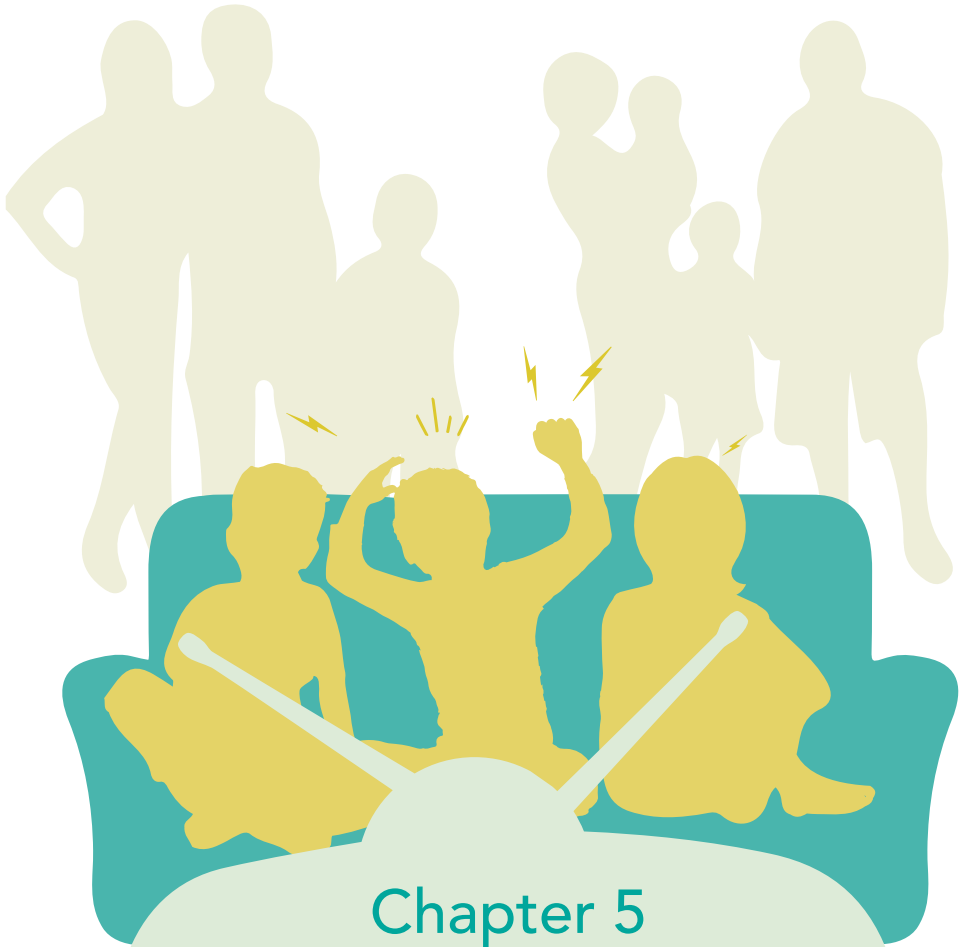
only effective in the potentially small subsample of children that is most vulnerable to violent media effects? And if so, what is the style in which such mediation would be most successful? A two-tiered approach to future research which consists of both theory development and empirical investigation may be the best way to uncover what active mediation can achieve, as well as how and for whom.

Conclusion

This study investigated the differential effectiveness of restrictive and active parental media mediation styles on early adolescents' media violence exposure and aggressive behavior. Our findings suggest some guidelines for parents who are concerned about the potential negative effects of media violence exposure on their children's aggression. Results indicate that restrictive mediation communicated in an autonomy-supportive way (i.e., providing a rationale for rules and listening to the child's perspective) is related to reduced media violence exposure and concurrent aggression. Alternatively, inconsistent restriction proved to be a problematic approach to media mediation. Restricting violent media use at some occasions while allowing it at others (perhaps as a reward) was related to more media violence exposure and aggression in youth. And finally, perhaps counter to popular beliefs, actively discussing violent media content with children was not superior to restrictive mediation. In this study, active mediation styles did not change the relationship between media violence and aggression. More work is certainly needed to better understand the effectiveness of restrictive and active mediation over time, as well as for whom active mediation may be an effective mediation tool. For now, this study shows researchers as well as parents that when it comes to parental mediation of violent media content, style matters.

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Chapter 5

The role of perceived peer norms in the relationship between media violence exposure and adolescents' aggression

ABSTRACT

This study investigated the role of a social context variable, perceived peer norms, in the relationship between media violence exposure and adolescents' aggressive behavior. This was informed by a need to better understand whether, how, and for whom media violence exposure may affect aggression. Three hypotheses were tested with peer norms as moderator, as mediator, and as both moderator and mediator in the relationship between media violence and aggression. A two-wave longitudinal survey measured media violence exposure, perceived descriptive and injunctive norms, and aggressive behavior among 943 adolescents (aged 10 to 14, 50.4% girls). Results provided support only for the moderated-mediation model. The indirect effect of media violence on aggression via perceived peer approval of aggression (i.e., injunctive norms) was moderated by perceived prevalence of peer aggression (i.e., descriptive norms). Specifically, media violence indirectly increased aggressive behavior for adolescents who perceived more peer aggression, but decreased aggression for adolescents who perceived less peer aggression. Implications for future research into media violence effects are discussed.

The role of perceived peer norms in the relationship between media violence exposure and adolescents' aggression

The social environment of adolescents provides them with multiple models for aggressive behavior. Media violence is one such factor that has been investigated for its potential modeling effects on youth's aggressive behavior. Although many studies have reported main effects of media violence on teens' aggressive behavior (e.g., Slater, Henry, Swaim, & Anderson, 2003; Krahe, Busching, & Möller, 2012), several others have yielded no such effects (e.g., Fikkers, Piotrowski, Weeda, Vossen, & Valkenburg, 2013; von Salisch, Vogelgesang, Kristen, & Oppl, 2011). An important explanation for these conflicting findings might be that adolescents differ in their susceptibility to the effects of media violence. The Differential Susceptibility to Media Effects Model (DSMM, Valkenburg & Peter, 2013a) posits that the size and nature of media effects are contingent on a variety of social context factors. Applying a differential susceptibility lens to the potential effects of media violence on adolescents' aggression can help researchers identify whether some adolescents are particularly susceptible to such effects, as well as offer insight into different underlying processes that may make adolescents more or less susceptible. This study focuses on a vital social context variable in adolescence – perceived peer norms – and investigates its role in the media violence-aggression relationship.

Peers provide an important source of social information during adolescence, a time in which peer influence increases while parental influence declines (Berndt, 1979). Peer behavior can influence adolescents' aggressive behavior through peer norms, defined as adolescents' perceptions about the frequency and approval of aggression in the peer group (Brechwald & Prinstein, 2011). Two types of peer norms have been distinguished in the literature: descriptive and injunctive peer norms. Descriptive norms are beliefs about the *prevalence* of a behavior (e.g., "How often are your friends aggressive?"), while injunctive norms pertain to the perceived *approval* of a behavior (e.g., "How OK do your friends think aggression is?"; Cialdini, Reno, & Kallgren, 1990). A large body of research has shown that perceptions about peer aggression indeed affect adolescents' own aggression (e.g., Benson & Buehler, 2012; Espelage, Holt, & Henkel, 2003; Henry et al., 2000).

Given that media effects do not take place in a social vacuum, it is important to consider the influence of adolescents' social environment in media violence research (Bronfenbrenner, 1999; Jordan, 2004). Currently, there is no empirical research that has jointly investigated peer norms and media violence exposure. Yet, several media effects theories suggest that perceived peer norms play a role in the relationship

between media violence and aggression, although not in a conceptually consistent way. While some theories would conceptualize perceptions of the social context (such as peer norms) as moderators, other theories see them as mediators (Valkenburg & Peter, 2013a). In order to improve our understanding of whether, for whom, and how media violence affects aggression, it is critical that this conceptual incoherence be addressed. To that end, this study conceptualized three hypotheses in which peer norms are treated as moderator, mediator, and as both a moderator and mediator in the relationship between media violence and aggression. To test these hypotheses, we conducted a two-wave longitudinal survey among Dutch adolescents aged 10 to 14. In doing so, we hope to provide more conceptual clarity on how adolescents' perceived social environment may change or explain the relationship between media violence and aggression.

Peer norms as moderator of media violence effects on aggression

The first way in which peer norms may play a role in the relationship between media violence and aggression is by affecting *for whom* such a relationship is present or more pronounced. This notion that not all media users are equally affected by media and that social context factors can moderate the relationship between media violence exposure and aggressive behavior has been put forward in several theoretical models (e.g., Social Cognitive Theory, Bandura, 2001; Cultivation Theory, Gerbner, Gross, Morgan, & Signorielli, 1980; Reinforcing Spirals Model, Slater, 2015; the Differential Susceptibility to Media Effects Model, Valkenburg & Peter, 2013a). In these theories, the concepts of "resonance" (Gerbner et al., 1980) and "context-content convergence" (Valkenburg & Peter, 2013a) predict that stronger media effects may occur among those media users for whom media messages are congruent with their real life. For example, for those adolescents who perceive more peer aggression in their environment, media violence may find more ground, thereby resulting in a stronger effect on aggression. On the other hand, for adolescents who do not perceive their peers to be aggressive, the potential impact of media violence on aggression may be reduced or even be absent (cf. Slater, 2007).

Although an interaction between media violence exposure and peer norms has not yet been investigated, several longitudinal studies provide evidence for the argument that adolescents' social experiences can change the media violence-aggression relationship. For example, Slater, Henry, Swaim, and Cardador (2004) showed that adolescents who were exposed to higher levels of both violent media content and peer victimization showed more aggressive behavior. Yang and Bushman (2014) similarly reported that a combination of higher violent media consumption and peer rejection

was related to increased behavioral problems. Outside the peer context, Fikkers et al. (2013) found that media violence predicted increased aggressive behavior for adolescents who were growing up in high conflict families, but not for adolescents in low conflict families.

Given the evidence from related research and the theoretical argumentation for differential media violence effects on aggression as a consequence of peer norms, it is reasonable to investigate whether adolescents who observe aggression in the media *and* perceive aggression as normative among their peers will show a larger increase in aggressive behavior compared to adolescents who perceive little or no peer aggression. Similarly, for adolescents who perceive little or no peer aggression in their environment, media violence and aggression may be less strongly related, or even not at all. Knowledge about such a moderating effect of peer norms helps identify *which* adolescents are most vulnerable to media violence effects. To that end, we test the following hypothesis:

Hypothesis 1 (H1): The relationship between media violence exposure and increased aggression is stronger for adolescents who perceive more peer aggression (descriptive norms; H1a), or who perceive more peer approval of aggression (injunctive norms; H1b).

Peer norms as mediator between media violence and aggression

A second way in which peer norms may play a role in a media violence-aggression relationship is by acting as a mediator between those variables. Although many media violence studies have tended to focus on direct effects, most media effects theories acknowledge that media exposure affects behavior indirectly, for example via affecting social cognitions, rather than directly (e.g., Anderson & Bushman, 2002; Bandura, 2001). Social cognitions are “the mental processes involved in perceiving, attending to, remembering, thinking about, and making sense of the people in our social world” (Moskowitz, 2005, p. 3). Perceived peer norms are a type of social cognition (Huesmann, 1998) that may form one of the possible paths from media violence to aggressive behavior.

Social information processing theories provide the underpinnings for how media violence may first increase perceptions of peer aggression (i.e., descriptive norms) and peer approval of aggression (i.e., injunctive norms), and how these increased peer norms may subsequently increase aggressive behavior. Media violence exposure is believed to increase the accessibility of aggression-related information in memory. This more accessible information subsequently has more weight when people make

judgments about the prevalence and approval of aggression (Riddle, 2010; Shrum, 1995). As a result, high violent media consumers may be more likely to report higher estimates of perceived prevalence and approval of aggressive behavior in their social environment compared to low violent media consumers. Following this, these higher perceived peer norms may influence the cognitive processes leading up to actual aggressive behavior (Huesmann, 1998). Several cognitive steps are believed to take place before someone acts aggressively, from accessing and retrieving scripts for aggression to evaluating whether or not to act aggressively (Crick & Dodge, 1994; Huesmann, 1998). Within the evaluation step of that process, beliefs about other people's aggression and approval of aggression (i.e., descriptive and injunctive norms) are used to assess the outcome desirability of behaving aggressively (Huesmann, 1998). Adolescents who perceive their peers as more accepting of and engaging in aggression may be more likely to evaluate aggressive behavior as desirable outcome, thereby increasing the likelihood of actual aggression.

Although there is no existing research on how peer norms may mediate the influence of media violence on aggression, studies in related fields indicate that such a mediation relationship could be expected. For example, Huesmann and Guerra (1997) investigated adolescents' normative beliefs as antecedents of aggressive behavior. Normative beliefs reflect adolescents' own acceptance of aggression, whereas descriptive and injunctive norms reflect their perceptions of the degree to which *their peers* are aggressive or approve of aggression. Research has shown that adolescents' normative beliefs can be affected by media violence exposure (Krahé & Möller, 2004; Linder & Werner, 2012), that normative beliefs are positively related to children's aggressive behavior (Huesmann & Guerra, 1997), and that they serve as a mediator between media violence and aggression (Gentile, Li, Khoo, Prot, & Anderson, 2014). Research on other media effects also suggests that peer norms are a potential route from media exposure to aggressive behavior. For example, a study by Bleakley, Hennessy, Fishbein, and Jordan (2011) showed that sexual media exposure increased adolescents' beliefs that sexual behavior was more common among their peers, which in turn was related to increased sexual behavior.

In all, there is a sound theoretical basis to expect that media violence may increase perceptions of peer aggression and peer approval of aggression, which may subsequently increase adolescents' aggressive behavior. This relationship is also tentatively supported by empirical evidence from related fields. Knowledge about such a mediating effect of peer norms helps identify *how* media violence may be related to increased aggressive behavior. To that end, we test the following hypothesis:

Hypothesis 2 (H2): Media violence exposure is related to an increase in aggressive behavior via an increase in the perceived prevalence of peer aggression (descriptive norms; H2a), and via an increase in the perceived peer approval of aggression (injunctive norms; H2b).

Exploring a dual role for peer norms: Moderator and mediator

Most media effects theories acknowledge that media use and the social environment are related to each other and to behavior in complex ways. Accordingly, conceptualizing the role of peer norms as *either* moderator *or* mediator in the link between media violence and aggression may not fully capture this complex relationship. Given that both moderation and mediation can be theoretically argued for, it is equally possible that peer norms may simultaneously moderate *and* mediate the effect of media violence on aggressive behavior.

Analytically, it is very complex to treat the same variable as moderator and mediator. However, given that peer norms consist of two types (descriptive and injunctive norms), we can conceptualize a model in which one of the two types of norms is treated as moderator, and the other as mediator. In our view, injunctive norms (i.e., perceived peer approval of aggression) would be a more plausible mediator than descriptive norms (i.e., the perceived prevalence of aggression). Although descriptive and injunctive norms are often treated similarly in the literature, they differ in the extent to which they can be based on real-life observations. Festinger's (1954) work on social comparison processes suggests that in the absence of objective bases for comparison, beliefs are likely to be unstable. Based on this line of reasoning, injunctive norms are expected to be less stable than descriptive norms, because peer approval of aggression cannot be directly observed whereas the prevalence of peer aggression can. Importantly, this may make adolescents' injunctive norms more susceptible to influences from other sources of information, such as the media, and thus more likely to mediate a relationship between media violence and aggression.

Similarly, we would argue that of the two types of peer norms, descriptive norms seem the more likely moderator. Cultivation Theory (Gerbner et al., 1980, p. 15) proposes that when an issue is particularly salient in the environment of a media user, media messages that are congruent with that issue may have stronger effects. Of the two types of norms, descriptive norms are arguably more salient than injunctive norms. Whereas injunctive norms represent a more implicit message about peers' approval of aggression, descriptive norms represent a more overt message about peers' frequency of aggressive behavior. The more overt nature of descriptive norms makes them a more salient form of norms when compared to injunctive norms. Thus, it is theoretically

more logical for descriptive norms to act as moderator than for injunctive norms.

Based on this line of reasoning, we hypothesize a moderated-mediation model with descriptive norms as moderator and injunctive norms as mediator. More specifically, we expect that for adolescents who perceive more peer aggression (i.e., higher descriptive norms), media violence will resonate more strongly and lead to an increase in their perception of peers' approval of aggression (i.e., injunctive norms). Subsequently, this increased perception of peer approval of aggression is expected to increase aggression. In other words, we expect a stronger mediation relationship between media violence exposure, increased injunctive norms, and increased aggression for those adolescents with higher descriptive norms. Conversely, for adolescents with low descriptive norms (indicating little or no perceived peer aggression), this mediation relationship may be weaker or absent. Investigating such a moderated-mediation process helps identify not only which adolescents are most vulnerable to media violence effects, but also how media violence leads to increased aggression for a potentially vulnerable subset of adolescents. To that end, we test the following hypothesis:

Hypothesis 3 (H3): The indirect effect of media violence on increased aggression through increased injunctive norms is stronger for adolescents with higher levels of descriptive norms.

METHOD

Participants and procedure

After receiving approval from the sponsoring institution's Institutional Review Board, a large, private survey research institute in the Netherlands (TNS NIPO/Veldkamp) collected the data. Families were recruited through TNS NIPO's existing online panel of approximately 60,000 households that is representative of the Netherlands. All households with at least two children between 10 and 14 (1,565 families in the panel) were invited to participate, of which 516 families participated. Data collection consisted of two waves, and took place in the adolescents' homes where they filled out a questionnaire on a laptop. The first wave of data collection was conducted between September and December 2012; the second wave was conducted between September and December 2013. Data collection procedures were identical for both waves.

A total of 1,032 adolescents participated in wave 1, and 1,011 adolescents participated again in wave 2 (a dropout of 2.03%). The final sample consisted of the 943 adolescents who had complete data on all study variables. Missing data was

random (i.e., not associated with household characteristics, media violence exposure, or aggression). This final sample consisted of 99.7% sibling pairs; 50.4% were girls; and the sample's mean age at Time 1 was 11.8 years ($SD = 1.4$ years).

Measures

Media violence exposure

Media violence exposure was measured using direct estimates of exposure to television and game violence. This method has been found reliable and valid for use in adolescent samples (Fikkers, Piotrowski, & Valkenburg, 2015). Direct estimates measured exposure to violent content on television and in electronic games with two items each (four items in total): (1) How often do you watch television programs [play games] that contain violence? and (2) On the days that you watch television programs [play games] that contain violence, how much time do you spend on this per day? Participants were given the following definition of violence: "All violence (for example, fighting and shooting) that living beings (for example, humans and monsters) do to each other." Games referred to all types of games (video games, but also casual games played on mobile phones or websites). Response categories for the first item ranged from 0 (never) to 7 (7 days per week). The second item was an open-ended question, answered by filling in hours and minutes. The two items for each medium were multiplied to calculate the number of hours per week of violent television and violent game exposure. These two variables were then summed to create one variable representing violent media exposure in hours per week. Adolescents in our sample reported an average of 5.29 hours per week ($SD = 10.93$) of media violence exposure at Time 1.

Descriptive norms

No existing scale was available for descriptive and injunctive norms about aggressive behavior. We therefore followed the procedure of studies investigating peer norms related to other behaviors in adolescent samples (e.g., Baumgartner, Valkenburg, & Peter, 2011; Elek, Miller-Day, & Hecht, 2006). Descriptive norms were measured with two items, asking adolescents to indicate how many of their friends showed the following two behaviors in the past six months: (1) swear at another adolescent; (2) kick or hit another adolescent. Participants were told that "friends" meant friends they see more than once a week, with whom they spent time, and who they liked doing things with. Response options were (1) none of my friends, (2) less than half of my friends, (3) about half of my friends, (4) more than half of my friends, and (5) almost all my friends. The two items were averaged to create a scale (Cronbach's $\alpha = .71$). Means and

standard deviations for Time 1 and Time 2 are reported in Table 1.

Injunctive norms

The measure for injunctive norms used the same items as for descriptive norms, but with a different question stem. Adolescents were asked what their friends think about (1) swearing at another adolescent, and (2) kicking or hitting another adolescent. Response options were (1) completely not OK, (2) not OK, (3) somewhat not OK, somewhat OK, (4) OK, and (5) completely OK. The two items were averaged to create a scale (Cronbach's alpha = .81). Means and standard deviations for Time 1 and Time 2 are reported in Table 1.

Aggressive behavior

Adolescents' direct aggression was measured using eight items from the Direct and Indirect Aggression Scale (DIAS, Björkqvist, Lagerspetz, & Kaukiainen, 1992). Adolescents were asked how often they do the following things when they are angry with another adolescent: (1) hit, (2) yell at or argue with, (3) kick, (4) swear at, (5) trip, (6) threaten to hurt, (7) push, or (8) fight with another adolescent. Response options were (1) never, (2) almost never, (3) sometimes, (4) often, and (5) very often. These items formed a reliable scale (Cronbach's alpha at both waves = .92). Means and standard deviations for Time 1 and Time 2 are reported in Table 1.

Gender (control variable)

We included gender as a control variable in all analyses (girls = 0; boys = 1).

Analytic approach

Structural equation modeling (SEM) in MPlus (version 7.11, Muthén & Muthén, 2014) was used to test all study hypotheses. In determining the appropriate manner in which to conduct these SEM models, four characteristics of the data were considered: (1) distributions of independent and dependent variables; (2) the longitudinal nature of the dataset and hypotheses; (3) the operationalization of the moderator and mediator roles of peer norms; and (4) the clustered nature of our sample due to the inclusion of siblings pairs.

Regarding variable distribution, media violence exposure and aggressive behavior were both positively skewed in our sample, with many adolescents reporting no aggression and no media violence exposure. As a result, traditional parametric analyses would increase the likelihood of making Type I errors (Atkins & Gallop, 2007). Although bootstrapping methods have been used as solution for analyses using non-normal

variables, these do not fully solve problems with highly skewed variables such as aggressive behavior (B. Muthén, 2011), while Poisson regression models are difficult to interpret in the context of longitudinal moderated-mediation analysis (VanderWeele & Vansteelandt, 2009). Our solution to address the data skewness was to create a change score for aggressive behavior between Time 1 and Time 2. Specifically, change scores for the eight individual aggression items were calculated by subtracting the Time 1 score from the Time 2 score. These eight change scores were then used as items in a factor analysis yielding a unidimensional factor structure with standardized factor loadings ranging from .51 to .74. Running the models with the original aggression variables instead of the change scores did not change the pattern of results.

Using this latent score for “change in aggression” had three consequences for our analyses. First, change in aggression was normally distributed, meaning we could proceed with parametric SEM analyses. Second, using a change variable as the dependent variable is statistically equivalent to using aggression at Time 2 as the dependent variable while controlling for aggression at Time 1. Therefore, by using the change score for aggression, our models took into account the longitudinal nature of our data. Third, the change score reduces the need for control variables. After all, control variables would have to explain change in aggression rather than level of aggression. We checked whether several common control variables, such as gender and socio-economic variables (e.g., income, educational level), correlated with change in aggression, but none did. For gender, we found a significant correlation with media violence exposure (see Table 1). Since this relationship may introduce bias (Wildt & Ahtola, 1978), and because it is the most common control variable in media violence research, we opted to include gender as control variable to provide a more conservative test of our hypotheses.

To account for the non-normal distribution of media violence exposure, we treated this variable as a count variable in the analyses. Count variables are variables that only have non-negative integer values. Because count variables can only have a limited number of values, we trimmed media violence exposure at 28 hours per week. Trimming meant that the values of 29 participants (3.1% of the sample) with media violence exposure of more than 28 hours were trimmed to the value of 28. Running the models with the original (untrimmed) variable, or with media violence exposure trimmed at different levels (e.g., at 20, 35, or 40) did not change the results. Mplus does not provide fit statistics or standardized coefficients in analyses using count variables. Therefore, all analyses were conducted twice: once with media violence treated as regular continuous variable, and once with media violence treated as count variable. We report the fit statistics and standardized coefficients based on the former analyses,

and unstandardized coefficients based on the latter analyses. Although these analyses treat the media violence exposure variable differently, we found minimal differences between the results.

Regarding the operationalization of the moderator and mediator variables, we operationalized descriptive and injunctive norms in two different ways depending upon the hypothesis. The moderation hypothesis (H1) expects that higher media violence exposure and higher peer norms at Time 1 interactively predict an increase in aggression. Therefore, when norms were investigated as a moderator in tests of H1 and H3, the Time 1 variable was used. At the same time, our mediation hypothesis (H2) predicts that media violence leads to a *change* in peer norms which subsequently predicts change in aggression. Therefore, when peer norms are used as a mediator in tests of H2 and H3, they are included as a change score. Change scores for both descriptive and injunctive peer norms were calculated by subtracting the Time 1 score from the Time 2 score. Means and standard deviations for these change scores are reported in Table 1.

Lastly, as noted in the participants section, 99.7% of our sample consisted of sibling pairs. Such clustering can result in over- or underestimation of coefficients due to biased estimates of standard errors (Desai & Begg, 2008). We accounted for this clustering by using the "cluster" option in Mplus to obtain corrected standard errors (Asparouhov & Muthén, 2006).

For all hypothesized models, we evaluated model fit by using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). We preferred these measures over the Chi-square statistic, given that this index is often unreliable with large samples. A good model fit is indicated by a CFI larger than 0.95 and an RMSEA smaller than .05. A CFI between 0.90 and 0.95 and an RMSEA between .05 and .08 indicate acceptable model fit (Kline, 2010). All models included gender as control variable (girls = 0; boys = 1).

RESULTS

Descriptive results and correlations

Table 1 presents the means, standard deviations, and correlations for all study variables. Adolescents in our sample reported on average 4.6 hours per week of media violence exposure (after trimming the variable; $SD = 6.87$). In general, adolescents perceived relatively low frequencies of peer aggression (descriptive norms: $M = 1.62$, $SD = 0.75$) and peer approval of aggression (injunctive norms: $M = 1.75$, $SD = 0.75$; both on a

scale from 1 to 5). Aggressive behavior was also relatively infrequent in our sample, with a reported mean of 1.61 ($SD = 0.69$) on a scale from 1 to 5. Test-retest correlations between Time 1 and Time 2 indicate that descriptive norms ($r = .41$), injunctive norms ($r = .43$), and aggressive behavior ($r = .59$) were stable over time.

Media violence exposure correlated positively with aggressive behavior both cross-sectionally ($r = .36, p < .001$) and longitudinally ($r = .33, p < .001$). In addition, media violence exposure was positively related to both descriptive and injunctive norms cross-sectionally (descriptive: $r = .25, p < .001$; injunctive: $r = .28, p < .001$) as well as longitudinally (descriptive: $r = .26, p < .001$; injunctive: $r = .28, p < .001$). In turn, descriptive norms correlated significantly with aggressive behavior (cross-sectional $r = .43, p < .001$; longitudinal $r = .31, p < .001$), as did injunctive norms (cross-sectional $r = .45, p < .001$; longitudinal $r = .34, p < .001$).

Peer norms as moderator

Hypothesis 1 predicted that media violence exposure would lead to an increase in aggressive behavior for those adolescents with higher descriptive peer norms (H1a) or higher injunctive peer norms (H1b). We tested separate models for each moderator. In each model, an interaction term between media violence and the moderator was included. Our hypothesized models had acceptable fit to the data, CFI = .96, RMSEA = .05 [90% confidence interval (CI) = .041 - .059] for descriptive norms as moderator; and CFI = .97, RMSEA = .047 [90% CI = .038 - .055] for injunctive norms as moderator.

Results did not support H1a or H1b. Neither descriptive norms ($b = .10, SE = .08, p = .204, b^* = .14$)¹ nor injunctive norms ($b = .01, SE = .09, p = .958, b^* = .01$) significantly moderated the relationship between media violence and change in aggression. In addition, there was no significant overall relationship between media violence exposure and change in aggression (main effect with descriptive norms in model: $b = -.01, SE = .01, p = .192, b^* = -.12$; with injunctive norms in model: $b = -.00, SE = .01, p = .918, b^* = -.01$).

Peer norms as mediator

Hypothesis 2 predicted that media violence exposure would lead to an increase in aggressive behavior via an increase in descriptive peer norms (H2a) and via an increase in injunctive peer norms (H2b). Our hypothesized model had a good fit to the data, CFI = .95, RMSEA = .048 [90% CI = .040 - .057]. Neither H2a

¹ Reported p -values refer to the unstandardized coefficients. For the standardized coefficients (b^*), the p -values were (nearly) identical and therefore not reported.

Table 1 Means, standard deviations, and zero-order correlations for all study variables

Variable	Mean (SD)	Zero-order correlations ^a												
		1	2	3	4	5	6	7	8	9	10			
1. Media violence exposure T1 ^b	4.60 (6.87)	-												
2. Descriptive norms T1	1.62 (0.75)	.25*	-											
3. Injunctive norms T1	1.75 (0.75)	.28*	.57*	-										
4. Aggression T1	1.61 (0.69)	.36*	.43*	.45*	-									
5. Descriptive norms T2	1.73 (0.84)	.26*	.41*	.36*	.36*	-								
6. Injunctive norms T2	1.85 (0.84)	.28*	.37*	.43*	.40*	.63*	-							
7. Aggression T2	1.62 (0.70)	.33*	.31*	.34*	.59*	.43*	.47*	-						
8. Change in descriptive norms	0.11 (0.86)	.02	-.40*	-.15*	-.02	.56*	.29*	.15*	-					
9. Change in injunctive norms	0.09 (0.84)	.03	-.15*	-.43*	-.01	.30*	.55*	.16*	.45*	-				
10. Change in aggression (latent)	0.01 (0.61)	.00	-.14*	-.13*	-.40*	.07*	.08*	.45*	.20*	.21*	-			
11. Gender (girls = 0; boys = 1)	-	.39*	.21*	.21*	.34*	.24*	.24*	.32*	.04	.06	.01	-		

Note. T2 variables were not used in the structural equation models.

^a Pearson's r correlations, which were converted from Kendall's tau-a correlations (which take into account non-normality and clustering) using Greiner's relation in Stata 12 (Newson, 2002).

^b Trimmed version of media violence exposure, as used in the analyses. Mean (SD) of the original variable is reported in the Method.

* $p < .05$.

nor H2b was supported by the results. Media violence exposure did not induce a change in descriptive norms ($b = .01$, $SE = .01$, $p = .304$, $b^* = .05$) nor a change in injunctive norms ($b = .01$, $SE = .01$, $p = .324$, $b^* = .04$). As a result, the indirect effect of media violence on change in aggression via the mediators was not significant (indirect effect through descriptive norms: $b = .00$, $SE = .00$, $p = .318$, $b^* = .01$; indirect effect through injunctive norms: $b = .00$, $SE = .00$, $p = .325$, $b^* = .01$).² Both mediators did show a significant relationship with the dependent variable: Change in aggression was predicted by change in descriptive norms ($b = .11$, $SE = .03$, $p < .001$, $b^* = .17$) as well as by change in injunctive norms ($b = .10$, $SE = .03$, $p = .001$, $b^* = .15$).

Peer norms as both moderator and mediator

Hypothesis 3 predicted that the indirect effect of media violence on increased aggression through increased injunctive norms would be stronger for adolescents with higher levels of descriptive norms. The model for this hypothesis consisted of media violence exposure at Time 1 as independent variable, descriptive norms at Time 1 as continuous moderator, change in injunctive norms as mediator, change in aggression as latent dependent variable, and gender as control variable. Our hypothesized model

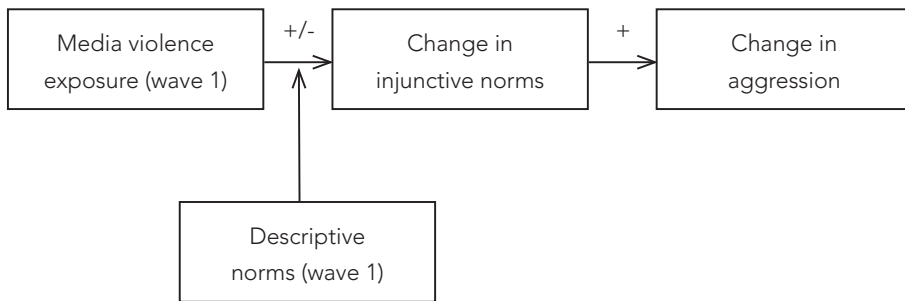
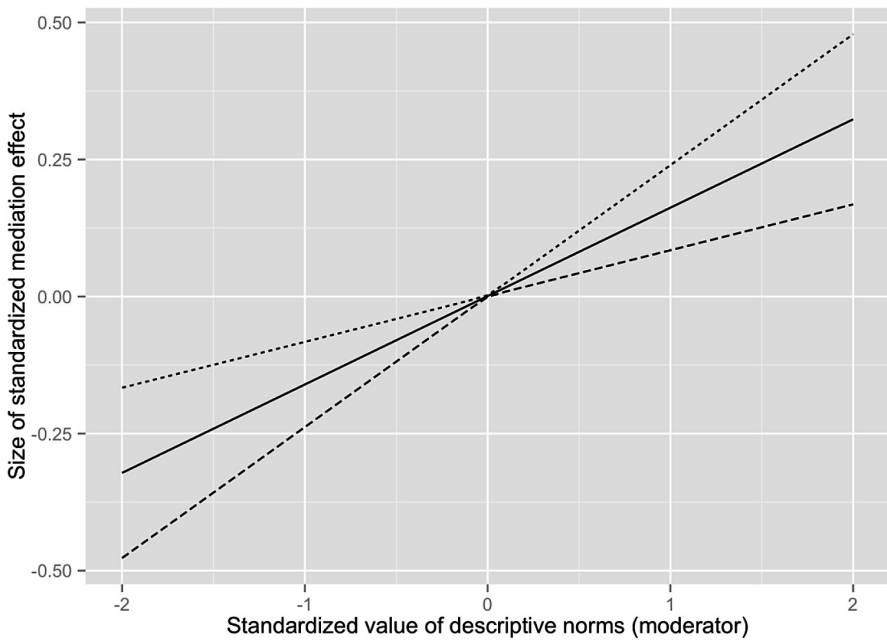


Figure 1 Model for the moderated-mediation hypothesis (H3). Gender was included as a control variable (not depicted). The relationship between media violence exposure and change in injunctive norms was positive at high values, and negative at low values of the moderator descriptive norms.

² Standard error should be bootstrapped for indirect effects, but this is not possible due to clustering in data and model. An unclustered bootstrap of standard errors of the indirect effect yielded the same estimates and slightly higher p -values. All other unstandardized coefficients in the Results are based on analyses that treat media violence exposure as count variable (as discussed in the Analytic Approach). Indirect effects, however, cannot be estimated in count models by Mplus. Therefore, for these indirect effects both the standardized and unstandardized coefficients are based on a model that treats media violence exposure as continuous variable.

had acceptable fit to the data, CFI = .95, RMSEA = .052 [90% CI = .042 - .061].

Results showed a moderated-mediation effect, supporting hypothesis 3. Recall that tests of hypothesis 2 indicated that the indirect (mediation) effect, on average, was non-significant, which was due to a non-significant relationship between media violence exposure and both mediators. Tests of hypothesis 3 indicate that media violence is related to change in injunctive norms, but that this relationship is moderated by descriptive norms (see Figure 1).



Mediation

- estimate of standardized mediation effect
- upper limit of Confidence Interval
- lower limit of Confidence Interval

Figure 2 The moderated mediation effect of media violence on change in aggression via change in injunctive norms. The y-axis represents the standardized indirect effect of media violence on aggression; the x-axis represents standardized values of the moderator (descriptive norms).

For example, at a value of one standard deviation above the mean for descriptive norms (indicating more perceived peer aggression) media violence leads to an increase in injunctive norms, whereas at a value of one standard deviation below the mean of descriptive norms (indicating less perceived peer aggression) media violence predicted a decrease in injunctive norms. As a result, for higher levels of descriptive norms, there is a positive standardized indirect effect ($b^* = .16$), whereas for lower levels of descriptive norms, there is a negative standardized indirect effect ($b^* = -.16$) of media violence exposure on change in aggression.

Figure 2 visualizes the size of this moderated indirect effect. The y-axis represents the standardized indirect effect of media violence on change in aggression via change in injunctive norms. The x-axis represents standardized values of the moderator (descriptive norms), with negative values indicating the number of standard deviations below the mean, and positive values indicating the number of standard deviations above the mean. The plotted diagonal line shows that for adolescents who perceive more peer aggression than average (the right-hand side of Figure 2), media violence increases aggressive behavior via an increase in perceived peer approval of aggression (i.e., injunctive norms). On the other hand, for adolescents who perceive less peer aggression than average (the left-hand side of Figure 2), media violence decreased aggressive behavior via a decrease in perceived peer approval of aggression.

DISCUSSION

The aim of this study was to examine the role of a social context variable, perceived peer norms, in the relationship between media violence and aggressive behavior. This was informed by a need to better understand whether, how, and for whom media violence exposure may affect aggression. We conceptualized and tested three ways in which perceived peer norms about aggressive behavior (descriptive and injunctive norms) may play a role in the relationship between media violence exposure and adolescents' aggression. We did not find support for the sole moderation (H1) or sole mediation (H2) hypothesis. We did, however, find support for our moderated-mediation hypothesis (H3) which posited that media violence would be related to increased aggression via increased injunctive norms (i.e., higher perceived peer approval of aggression), and that this indirect effect would be stronger for adolescents with higher levels of descriptive norms (i.e., higher perceived prevalence of peer aggression).

Moderation findings

Grounded in Cultivation Theory (Gerbner et al., 1980), hypothesis 1 posited that the relationship between media violence exposure and increased aggression would be stronger for adolescents with higher descriptive or injunctive norms. While this omnibus prediction was not supported, the results of the moderated-mediation analysis (H3) did indicate that media violence and descriptive norms have an interactive influence on the mediator, change in injunctive norms. Given that Cultivation Theory focuses more on media influence on real-world *perceptions* than on actual behavior (cf. Romer & Jamieson, 2014), it is perhaps not strange that we found that perceptions of peer approval of aggression were affected by this interaction rather than aggressive behavior directly. That said, the absence of an interaction effect on aggressive behavior does diverge from previous longitudinal research (e.g., Fikkers et al., 2013; Slater et al., 2004; Yang & Bushman, 2014). Differences in time lag (one year versus 4 or 6 months) or in the peer variable (perceived peer aggression versus peer rejection) may underlie the absent interaction effect on aggression. Additionally, longitudinal effects of media violence on aggression are perhaps less easily detected compared to effects on intermediary cognitive variables, especially when aggression is quite stable (Adachi & Willoughby, 2014). Longitudinal research is arguably most suitable for studying the role of social context factors in media effects, because of the higher ecological validity and the opportunity to move beyond cross-sectional correlations. At the same time, the usual limitations associated with survey research (e.g., reliance on single respondents, self-report and recall) also apply to our study. Therefore, it would be relevant to see whether these findings replicate in an experimental setting, which, due to its higher internal validity, may be better suited to detect small and subtle effects of media violence exposure.

Despite the absence of a longitudinal interaction effect on aggression, our finding that injunctive norms were affected by a combination of media violence and descriptive norms indicates that the route from media violence to aggression differs for youth growing up in different contexts. Although previous researchers have identified and studied several potential mediating variables in the media violence-aggression relationship (for a review, see Krahé, 2014a), little research has examined how the role of these mediators may be dependent on different environments. For example, it is unclear whether media violence exposure increases hostile attribution bias or decreases empathy more for adolescents who perceive more peer aggression compared to adolescents who do not perceive peer aggression. In addition, it is unclear what happens for different adolescents *during* media violence exposure: Do adolescents who also perceive aggression in real life have more attention for media violence, do

they like it more, and do they experience more arousal during the consumption of violent media compared to adolescents not growing up in an aggressive environment? Investigating such questions can go a long way towards identifying not only for whom and how media violence may influence aggression, but also towards identifying ways to minimize potential negative effects.

Mediation findings

In addition to expecting evidence of moderation, theory also pointed to the potential mediating role of peer norms in the relationship between media violence and aggression (e.g., Anderson & Bushman, 2002; Bandura, 2001). As with our moderation hypothesis, our omnibus mediation hypothesis was not supported. When looking at the mediation effect across our full sample, perceived peer norms did not mediate the effect of media violence on aggressive behavior (H2). However, the moderated-mediation analysis (H3) indicated that the mediation was in fact not absent, but instead differed for different subgroups (see Figure 1). Specifically, for adolescents who perceived greater peer aggression in their environment (i.e., descriptive norms), exposure to media violence was related to an *increase* in perceived peer approval of aggression (i.e., injunctive norms). On the other hand, for adolescents who perceived less peer aggression in their environment, media violence exposure was related to a *decrease* in perceived peer approval of aggression. As a consequence, media violence indirectly led to more aggression for adolescents with high perceived peer aggression, but to less aggression for adolescents with low perceived peer aggression.

Initially, we only expected that the indirect relationship between media violence and aggression would be stronger for adolescents with higher descriptive norms, and weaker or absent for adolescents with lower descriptive norms. This expectation was based on several theoretical models (Gerbner et al., 1980; Valkenburg & Peter, 2013a) that predict stronger media effects when media content is congruent with the perceived social context. Our results show support for this congruency argument. Adolescents who consume violent media and perceive greater peer aggression were more likely to believe that their peers approve of aggression, which was related to an increase in aggressive behavior. The convergence of messages received from the media and peers resulted in a boosted indirect effect on adolescents' aggressive behavior.

Somewhat unexpectedly, for adolescents with lower descriptive norms, the mediation relationship was not weaker or absent, but rather in the reverse direction. For adolescents who perceived little to no peer aggression in their environment, media violence decreased their belief that peers would approve of aggression, which subsequently resulted in less aggressive behavior. Typically, real-life socialization

agents in adolescents' lives, such as parents, school, and the community, encourage adolescents to be prosocial rather than aggressive, whereas media violence presents adolescents with a different view (Arnett, 1995, p. 526). Given that interpersonal sources generally carry more weight than media content (Chaffee, 1986), it seems that adolescents may solve such an incongruence between media content and peer behavior by discounting the messages in the media. Watching aggression in the media while perceiving no real-life aggression among their peers may strengthen adolescents' beliefs that "my friends wouldn't like that" and, as a result, they are less motivated to engage in aggressive behavior. Future research on how youth integrate violent media messages that run counter to the arguably strong socialization messages from parents and schools could potentially identify ways to reduce the effect of media violence on increased aggression.

Implications

In all, our findings provide two important implications for future research and theory about media violence effects. First, our findings provide further support for the idea that (perceptions of the) social context can make some adolescents more susceptible to media effects. Importantly, we found that adolescents' social environment may not only strengthen, but also reverse effects of media violence on aggression. This finding does not neatly fit into most of the traditional media violence theories that focus on explaining how media violence may increase aggression (e.g., the General Aggression Model, Anderson & Bushman, 2002; Social Cognitive Theory, Bandura, 2001). More recent differential susceptibility perspectives (e.g., Slater, 2015; Valkenburg & Peter, 2013a), however, allow for the possibility that the strength of the relationship between media violence and aggression can be changed by one's social context. The findings of this study can be seen as extending these perspectives by showing that social context can also affect the *direction* of the relationship. Recently, Piotrowski and Valkenburg (2015) have called for research that not only investigates how negative outcomes of media use may be increased by negative individual difference factors, but also how they may be decreased by positive factors. Our study is the first to show that media violence may indirectly decrease aggression in a positive social context (i.e., in absence of perceived peer aggression). Future research should replicate these findings, as well as explore how other positive social context factors (e.g., parental media mediation) may mitigate or reverse the negative effects of media violence on aggression.

Second, our findings illustrate that moderated-mediation was a more accurate conceptualization of the complex relationship between media violence, social context, and aggression, whereas the more simplistic moderation and mediation models

resulted in a suboptimal conceptualization of media effects (cf. Valkenburg & Peter, 2013a). Indeed, only through moderated-mediation did we discover that mediation did take place, but in different directions for different adolescents. Similarly, only through moderated-mediation did we learn that moderation did take place, but that this affected the mediator rather than the dependent variable aggression. In fact, the contribution of media violence to adolescents' aggression in our sample was modest at best, and more pronounced in its influence on the cognitive mediator (amongst a subset of teens) than on aggression itself. This study therefore supports the argument that media effects research should simultaneously investigate moderation and mediation in order to fully understand whether, how, and for whom media violence affects aggressive behavior. Such research would answer both the call for a more nuanced view on media violence effects as well as the need for research that better maps onto media effects theories, few of which posit universal and direct effects (Valkenburg & Peter, 2013b).

Conclusion

Although media violence effects are heavily debated, most researchers seem to agree that if media violence has an effect, it is not universal nor is it likely to affect aggression directly. Yet, despite this agreement, most empirical research still reflects such a universal-and-direct-effects perspective (Valkenburg & Peter, 2013a, 2013b). This study moved beyond this traditional perspective and explored whether and how a social context variable, perceived peer norms, may influence the media violence-aggression relationship. Results of this study show that perceived peer norms both moderate *and* mediate the relationship between media violence and aggression. Specifically, media violence increased beliefs of peer approval of aggression for adolescents who perceived greater peer aggression, which subsequently resulted in increased aggression. Conversely, for adolescents who perceived little to no peer aggression, media violence exposure decreased such beliefs and subsequent aggression. These findings point to the important role of social perceptions in the media violence-aggression relationship. Moving forward, it is crucial that media violence researchers pay more attention to what happens when media violence converges or conflicts with an adolescent's social environment, and how this may subsequently increase or decrease adolescents' aggression. Moreover, our findings suggest that it is vital to ask for whom and how media violence may increase aggression, rather than assuming that this process is similar for all media violence consumers (cf. Gunter, 2008; Valkenburg & Peter, 2013a).

This chapter has been submitted for publication.



Chapter 6

Beyond the lab: Investigating early adolescents' cognitive, emotional, and arousal responses to violent games

ABSTRACT

Cognitive, emotional, and arousal responses to violent games play a central role in theoretical explanations of how violent media may affect aggression. However, existing research has focused on a relatively narrow range of responses to violent games in experimental settings. This limits our understanding of whether and how violent game-induced responses relate to aggression in real life. To address these gaps, this study investigated how cognitive effort, emotional valence, and arousal in response to violent games relate to early adolescents' aggression, both cross-sectionally and over a period of one year. In addition, we investigated how a social context variable (i.e., family conflict) predicts these responses to violent games and subsequent aggression. A sample of 448 early adolescents (10 to 14 years) completed survey questions and media diaries that measured their responses to violent games. Results showed that, outside the lab, a positive cross-sectional relationship between violent game-induced arousal and aggression exists. In addition, arousal mediated the relationship between family conflict and aggression. Study findings justify increased research attention to media responses outside the lab and a need for further theoretical and methodological refinement.

Beyond the lab: Investigating early adolescents' cognitive, emotional, and arousal responses to violent games

The relationship between violent game play and young people's aggressive behavior has been studied for decades, with a number of studies finding a significant positive relationship (e.g., Krahé, Busching, & Möller, 2012; Krömer & Lachlan, 2009) while others report that game violence and aggression are not related (e.g., Adachi & Willoughby, 2011; Ferguson & Rueda, 2010). In order to better understand whether and how violent game play may affect aggressive behavior, researchers have studied the processes through which violent game play and aggression may be related (for a review, see Krahé, 2014a). Most empirical work in this field has been informed by the General Aggression Model (GAM, Anderson & Bushman, 2002), which posits that a person's cognitive, emotional, and excitative (arousal) responses to violent games play a key role in how violent games may contribute to aggression. In the short term (i.e., immediately after violent game play), a player may experience increased aggressive thoughts, aggressive emotions, and physiological arousal, each of which is thought to increase the likelihood of aggressive behavior at that moment (Anderson & Bushman, 2002). After repeated experiences of such responses to violent games, more long-lasting effects may take place, such as the development of aggressive knowledge structures, disinhibition, and desensitization (Anderson & Bushman, 2002). These changes in a person are proposed to contribute to more long-lasting changes (increases) in aggression.

Although a large number of studies have investigated responses to violent games, there are two important limits to our knowledge that hinder a complete understanding of these processes. First, cognitive, emotional, and excitative responses to violent games have exclusively been studied in experimental settings (for a review, see Barlett, Anderson, & Swing, 2009). Such research is characterized by high control over the violent stimulus and measurement of subsequent responses (i.e., high internal validity), but also by typically smaller samples of (young) adults, short exposure to a preselected stimulus, and an aggression-inducing situation directly after exposure (i.e., lower external validity). Thus, the conclusions of this body of work are currently limited to relatively direct effects in very controlled settings, whereas parents and practitioners are often more concerned about real-world and longer-term effects on children and adolescents. In addition, little knowledge exists about how the social context in which an adolescent grows up may affect the strength of responses to violent games and consequently the extent to which youth may become aggressive (cf. Valkenburg & Peter, 2013a). Testing such relationships in adolescents' home environment would

not only help us understand whether and how violent game play may be related to aggressive behavior, but also for whom this holds in particular. Therefore, the first aim of this study was to explore the “real-life” relationships between violent game-induced responses and adolescents’ aggression (both cross-sectionally and longitudinally), as well as how such responses may be predicted by family conflict – a relevant social context factor related to media violence and aggression.

A second limitation to our knowledge about responses to violent games is that most empirical studies, as guided by the GAM, have focused on a limited range of cognitive and emotional responses to violent games (while arousal is generally conceptualized similarly across studies). As a theory of human aggression, the processes explicated by the GAM are logically directed towards this particular outcome. Thus, cognitive responses are conceptualized as aggressive thoughts and emotional responses as anger or hostility – with experimental research following accordingly. From a media-entertainment perspective, however, this is a relatively narrow view of the scope of potential responses to violent games. For example, the Differential Susceptibility to Media Effects Model (DSMM, Valkenburg & Peter, 2013a) offers a broader view of responses to media by conceptualizing cognitive responses as “the extent to which media users selectively attend to and invest cognitive effort to comprehend media content,” and emotional responses as “all affectively valenced reactions to media content” (Valkenburg & Peter, 2013a, p. 228). Taking such a broader view on responses to violent games may further advance our thinking and understanding of violent game processes and effects. Therefore, inspired by both the GAM and the DSMM, the second aim of this study was to investigate how media-relevant responses to violent games (cognitive effort, emotional valence, and arousal) are related to adolescents’ aggressive behavior. This was done by combining media diaries that captured cognitive, emotional, and excitative responses to violent game play with longitudinal survey data that assessed adolescents’ aggressive behavior and social context.

Cognitive responses

Many theories that attempt to explain effects of media content rely on learning mechanisms (e.g., GAM, Anderson & Bushman, 2002; Social Cognitive Theory, Bandura, 2009), effectively placing cognitive responses to media at the heart of media effects. Numerous concepts have been studied under the umbrella of cognitive responses to media (Valkenburg & Peter, 2013a). In media violence research, cognitive responses are generally conceptualized as the accessibility of aggressive thoughts through priming. The GAM posits that violent game play increases the accessibility of aggressive thoughts in memory, which may then increase the likelihood of aggressive

behavior at that time (Anderson & Bushman, 2002). Experiments suggest that violent media use indeed temporarily makes aggressive thoughts more easily accessible (e.g., Barlett & Rodeheffer, 2009; Bushman, 1998). However, because priming effects tend to dissipate quickly (Roskos-Ewoldsen, Roskos-Ewoldsen, & Dillman Carpentier, 2009), this conceptualization of cognitive responses is applicable only to situations where aggression is tested immediately after violent game play (i.e., experimental settings). Because such situations are less common in real life, it is relevant to explore alternative cognitive responses that may be able to explain a potential relationship between violent game play and aggression outside the lab.

Research on mediated message processing and learning indicates that cognitive effort, or the amount of cognitive resources allocated to processing and comprehending a message (Fisch, 2000; Lang, 2000; Salomon, 1984), may be a key variable for the learning and development of aggressive cognitions during violent game play. This body of work suggests that higher cognitive effort while playing a violent game results in deeper processing and more elaboration on the game (Fisch, 2000; Lang, 2000; Salomon, 1984). This may result in a more thorough integration of the game content into a game player's associative networks, facilitating later retrieval and learning of the message (Fisch, 2000; Lang, 2000; Salomon, 1984). Unlike the temporarily enhanced accessibility of aggressive thoughts as a result of priming, the more thorough integration of aggressive content in memory as a result of higher cognitive effort can be expected to last beyond a specific game play situation. Thus, investigating cognitive effort as a cognitive response to violent games may explain how such responses can ultimately affect real-life aggressive behavior. Therefore, we pose the following hypothesis:

Hypothesis 1 (H1): Higher cognitive effort during violent game play is related to increased aggressive behavior both cross-sectionally (H1a) and longitudinally (H1b).

Emotional responses

In addition to cognitive responses, scholars argue that emotional responses to media content are important as well (Nabi, 2009). Although a wide array of emotional responses to media content have been studied in the broader media effects literature, media violence research generally focuses on aggression-related emotions in response to violent games, such as anger and hostility. These emotional responses are proposed to increase aggressive behavior (Anderson & Bushman, 2002). However, this focus on negative emotions overlooks the fact that violent games are a popular

form of entertainment and are designed to evoke positive emotional responses as well (Schneider, Lang, Shin, & Bradley, 2004). If violent games also evoke positive feelings, then it is important to understand whether and how such responses may relate to adolescents' aggressive behavior.

Although the GAM does not provide an explicit explanation for how positive responses to violent games may relate to aggression, other work by media violence researchers suggests that positive emotions experienced during violent game play may increase the likelihood of aggression by creating positive associations with such behavior (Carnagey, Anderson, & Bushman, 2007; Krahé et al., 2011; Lang, Bradley, Schneider, Kim, & Mayell, 2012). In general, people are believed to be inhibited from acting aggressively because they feel negative about such behavior (Crick & Dodge, 1994). However, when aggression is paired with positive emotions, people may be disinhibited from acting aggressively, that is, they may not have such reservations against aggression (Krahé et al., 2011; Lang et al., 2012). Violent games provide a context in which violent acts are often paired with positive emotions (Lang et al., 2012), which may thus contribute to creating positive associations with aggressive acts. As a result, "people who react less negatively to violent media scenes and experience more positive reactions to such scenes should be more aggression prone" (Krahé et al., 2011, p. 632). Although some studies have shown that violent media can evoke happy or positive feelings (e.g., Lang et al., 2012; Schneider et al., 2004), no research has investigated whether or how such responses are related to aggressive behavior. Based on the theoretical explanation for how positive feelings induced by violent games may increase the likelihood of aggression in real life, we pose the following hypothesis:

Hypothesis 2 (H2): A more positive emotional response to violent games is related to increased aggressive behavior, both cross-sectionally (H2a) and longitudinally (H2b).

Excitative responses

Lastly, next to cognitive and emotional responses, violent games can also evoke excitative (arousal) responses (Anderson & Bushman, 2002; Valkenburg & Peter, 2013a). Arousal is an energizer of behavior that is in itself not inherently positive or negative (Zillmann, 1991). High arousal evoked by violent games is proposed to increase aggressive behavior by energizing action tendencies immediately after game play (i.e., excitation transfer, Anderson & Bushman, 2002; Zillmann, 1991). Over time, repeated experience of arousal during violent game play is thought to result in *lower* arousal levels in response to violent imagery (i.e., desensitization, Carnagey et al., 2007). Such

reduced arousal is hypothesized to be related to reduced sympathy for victims, less negative attitudes towards violence, less inhibition against acting aggressively, and ultimately, to increased aggression (Carnagey et al., 2007; Krahé et al., 2011). Thus, theory predicts a positive relationship between violent game-induced arousal and aggressive behavior immediately after game play, but a negative relationship in the long term.

However, neither of these perspectives sufficiently explains how arousal induced by violent games may be related to aggressive behavior outside the experimental context. Aggressing immediately after game play is unlikely to be very common in real life, and the theoretical explanations for long-term effects are remarkably unspecific, essentially only indicating that media violence exposure should be “repeated” and “long-term” for such patterns to occur (Carnagey et al., 2007). In addition, studies into violent game-induced arousal are exclusively short-term experimental studies (including those that investigate desensitization, e.g., Carnagey et al., 2007; Krahé et al., 2011), and only very few actually test whether such arousal is related to aggression. Because of a lack of non-experimental research and clear theoretical expectations, we do not yet fully grasp whether or how violent game-induced arousal and aggression are related in real life (also noted by Anderson et al., 2010; Grizzard et al., 2015). This study extends the experimental body of knowledge and takes a first step towards a better understanding of this relationship by exploring it outside the lab. To that end, we pose the following research question:

Research Question 1 (RQ1): What is the relationship between violent game-induced arousal and aggressive behavior, cross-sectionally (RQ1a) as well as longitudinally (RQ1b)?

Family conflict as predictor of responses to violent games

Most theoretical models used in media effects research posit that media use elicits cognitive, emotional, and excitative responses that explain why effects of media may take place (e.g., Anderson & Bushman, 2002; Valkenburg & Peter, 2013a). These models also propose that how people respond to media is not only the result of the type of content they are using (such as violent games), but also a result of individual characteristics such as their social context, personality, and developmental level. As such, if we want to better understand the role of media responses, we must not only look at their consequences, but also at their potential origins.

Although individual differences are often treated as moderators in media effects theory and research, this study conceptualizes them as direct predictors of responses

to violent games for two reasons. First, individual differences are theorized to moderate the relationship between *exposure* to violent games and subsequent *responses*, not the relationship between responses and subsequent outcomes such as aggression (Valkenburg & Peter, 2013a). In other words, although some adolescents are expected to experience stronger responses to violent games than others, the relationship between these responses and subsequent aggression is expected to be the same across all adolescents. Given that the current study focuses on this second step, treating individual differences as moderators would be conceptually inappropriate.

Second, this study focuses specifically on adolescents' responses *while playing* violent games. Although media effects models often make a conceptual distinction between exposure and responses to media, in actuality one cannot experience responses to a violent game without being exposed to it. Thus, in this study on "violent game-induced responses," exposure to violent games is automatically implied and not a distinct preceding construct. As a consequence, although individual differences are theoretically seen as moderators of the *relationship* between exposure and responses, in this study we conceptualize them as direct predictors of the combined construct "violent game-induced responses." Specifically, this study explores whether and how responses to violent games and subsequent aggression are predicted by family conflict, a relevant social context variable related to media violence and aggression (see Figure 1).

Family conflict is defined as openly expressed anger, hostility, and aggression in the home (Moos & Moos, 1994). Several studies have shown that family conflict predicts both media violence exposure (Vandewater, Lee, & Shim, 2005) and aggression

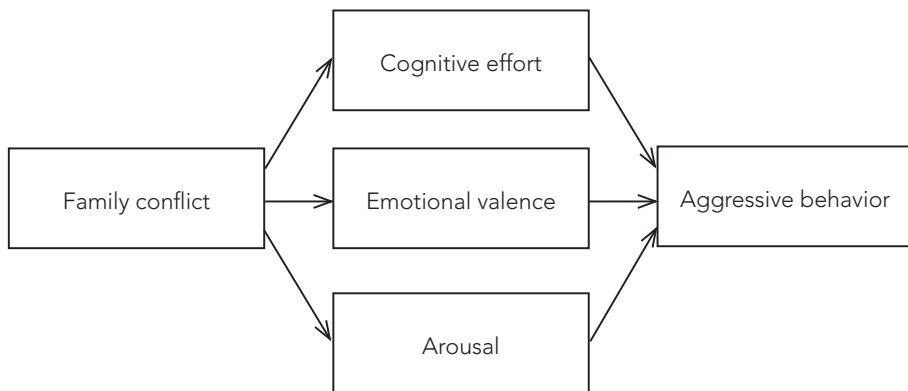


Figure 1 Conceptual model of the relationship between family conflict, responses to violent games, and aggressive behavior.

(Ribeaud & Eisner, 2010), and moderates the relationship between media violence exposure and aggression (Fikkers, Piotrowski, Weeda, Vossen, & Valkenburg, 2013). Theoretically, family conflict has been argued to contribute to aggressive behavior via social learning processes (Margolin & Gordis, 2000) and maladaptive processing of social information (Schultz & Shaw, 2003). In addition, repeated exposure to conflict in the home can result in chronic elevation of arousal in children (Davies & Cummings, 1994). Given this maladaptive responding to real-life situations as a consequence of conflict in the child's environment, it is reasonable to ask whether family conflict also affects how children respond to violent games. Media effects theories propose that when a child's social environment converges with what he or she sees in the media, this may result in a stronger effect of media (called context-content convergence or resonance), potentially through stronger responses (Valkenburg & Peter, 2013a). In other words, adolescents who experience higher levels of family conflict may also experience stronger responses when playing violent games, and increased aggression as a consequence. Given that there is no existing research on the relationship between family conflict, violent game-induced responses, and subsequent aggression, we pose the following research question:

Research Question 2 (RQ2): Does family conflict predict adolescents' cognitive, emotional, and excitative responses to violent games and subsequent aggressive behavior, cross-sectionally (RQ2a) and longitudinally (RQ2b)?

METHOD

Participants and procedure

After receiving approval from the sponsoring institution's Institutional Review Board, a large, private survey research institute in the Netherlands collected the data. Of the 1,565 families with at least two children between 10 and 14 in the online panel, 516 families participated. Data collection consisted of two waves, and took place in the adolescents' homes where they completed the questionnaire on a laptop. The first wave of data collection was conducted between September and December 2012; the second wave between September and December 2013. In addition to the questionnaire, respondents completed media diaries that were used to measure responses to violent games.

A total of 1,032 early adolescents participated in wave 1. To be included in this study, respondents had to have complete data on the relevant variables for this study

in wave 1 and wave 2. In addition, respondents had to report playing at least one game that contained violent content in their media diaries. Out of the 707 respondents who reported playing at least one game in their media diaries, 448 respondents reported at least one *violent* game title. These 448 respondents made up the final sample (54.9% sibling pairs; 24.8% girls; mean age at Time 1 = 11.8 years, $SD = 1.4$ years). For 28 respondents, no Time 2 aggression data were available. These 28 respondents could therefore not be included in the longitudinal analyses, but were included in the cross-sectional analyses.

Responses to violent games

Media diaries were used to measure responses to violent games (for a detailed description of the set-up of the media diaries, see Fikkers, Piotrowski, & Valkenburg, 2015). Respondents were invited to complete online media diaries on up to four days, in which they reported all titles of games played on those days as well as how long they played. For each game, respondents reported their cognitive, emotional, and excitative responses, which were measured with one item each in order to keep the length of the media diary manageable. For cognitive effort, respondents reported how much effort they had put into understanding the game on a scale from (1) very little, to (5) a lot (cf. Salomon, 1984). Emotional and excitative responses were operationalized as valence and arousal, and measured using Bradley and Lang's (1994) Self-Assessment Manikin (SAM). This scale uses a five-point pictorial response option paired with verbal anchors. For valence, adolescents indicated how they felt while playing the game on a scale from (1) sad, with a picture of a sad manikin, to (5) happy, with a picture of a happy manikin. Self-reported arousal during violent game play was measured on a scale from (1) not at all aroused, accompanied by a picture of a calm manikin, to (5) very aroused, which was accompanied by a picture of a very excited manikin.

In order to establish which responses in the diary were induced by *violent* games, all game titles were coded using the Pan European Game Information (PEGI) system, which informs gamers about whether or not a game contains violent content. Trained coders coded the game titles by looking up their violence ratings in the online PEGI database. All game titles that were not in the online database were played by the coders and coded following the official PEGI guidelines. For both of these steps, reliability was evaluated by double-coding at least 25% of the unique titles in the dataset. Coding reliability was high (Kappa's ranged from .74 to .96).

To create variables for cognitive effort, valence, and arousal, we extracted all game titles that received a violent content rating and their accompanying responses from the media diaries. For respondents with more than one violent game title, we calculated

the average cognitive effort, valence, and arousal over the violent game titles. Means and standard deviations for each response are reported in Table 1.

Aggressive behavior

Adolescents' direct aggression was measured using eight items from the Direct and Indirect Aggression Scale (Björkqvist, Lagerspetz, & Kaukiainen, 1992). For example, adolescents were asked how often they hit, swear at, or fight with another adolescent. Response options ranged from (1) never, to (5) very often. Items formed a reliable scale (Cronbach's $\alpha = .93/.92$ at Time 1/2). We summed the eight aggression items and recoded the variable so that it started at zero (recoded range: 0-32). Mean and standard deviation of this variable are reported in Table 1.

Family conflict

Family conflict was measured using five items from the conflict subscale of the Family Environment Scale (Moos & Moos, 1994). For example, respondents reported how often family members hit each other or become so angry they start throwing things. Response categories ranged from (1) never, to (4) often. Scores were averaged to create scales (Cronbach's $\alpha = .73$), with higher scores indicating greater family conflict. The mean and standard deviation are reported in Table 1.

Control variables

Time spent playing violent games

Respondents indicated in their media diaries how long they had played a particular game by selecting 30-minute time intervals (e.g., 6:00-6:30 p.m., 6:30-7:00 p.m., etc.) during which that game had been played. We summed all 30-minute time intervals reported for violent game play, resulting in a number of hours playing violent games over the course of a minimum of one and a maximum of four diary days. The mean and standard deviation are reported in Table 1. Time spent playing violent games was included as control variable in all models to ensure that any relationships found are a result of *responses* to these games, and not of the time spent playing them.

Gender

Gender was included in all models, coded as girls = 0 and boys = 1.

Analytic approach

Aggressive behavior was positively skewed in our sample, with many adolescents (22.3%) reporting no aggression. For all cross-sectional analyses, comparison of Zero-

Inflated Poisson regression models with ordinary least squares regression showed that model fit was consistently better for OLS regression than for ZIP regression. We therefore report the results based on parametric OLS analyses. For all longitudinal analyses, we addressed skewness of aggression by creating a change score by subtracting the Time 1 sumscore from the Time 2 sumscore for each respondent. Using a change score is statistically equivalent to using aggression at Time 2 as the dependent variable while controlling for aggression at Time 1. The change score was normally distributed, meaning that we could proceed with parametric analyses for all longitudinal hypotheses and research questions.

Stata 12 was used to address H1, H2, and RQ1. To evaluate RQ2, we ran structural equation models in Mplus (version 7.11, Muthén & Muthén, 2014). We evaluated model fit by using the comparative fit index (CFI) and the root mean square error of approximation (RMSEA). We preferred these measures over the Chi-square statistic, given that this index is often unreliable with large samples. A good model fit is indicated by a CFI larger than 0.95 and an RMSEA smaller than .05. A CFI between 0.90 and 0.95 and an RMSEA between .05 and .08 indicate acceptable model fit (Kline, 2010). All analyses controlled for gender and time spent playing violent games. Because 54.9% of the sample consisted of sibling pairs, standard errors were adjusted for clustering in all analyses.

RESULTS

Descriptives

Table 1 presents the means, standard deviations, and intercorrelations among study variables. Recall that higher scores for the response variables mean more self-reported effort invested in understanding the violent game, happier feelings, and higher arousal in response to violent game play. Aggression at Time 1 correlated with emotional valence and arousal (valence: $r = -.11$, $p = .027$; arousal: $r = .19$, $p < .001$), but not with cognitive effort ($r = -.03$, $p = .473$). Aggression at Time 2 correlated with arousal ($r = .13$, $p = .008$), but not with cognitive effort ($r = -.01$, $p = .888$) or valence ($r = -.06$, $p = .196$). Change in aggression did not correlate with any of the three responses. Lastly, family conflict correlated significantly with cognitive effort ($r = .15$, $p = .002$) and arousal ($r = .15$, $p = .004$) while playing violent games.

Table 1 Means, standard deviations, and zero-order correlations

Variable	Observed Mean (SD) Range	Zero-order correlations ^a								
		1	2	3	4	5	6	7	8	
1. Family conflict	2.19 (0.56) 1-4	-								
2. Cognitive effort	2.42 (1.11) 1-5	.15*	-							
3. Valence	4.34 (0.65) 2-5	-.06	-.12*	-						
4. Arousal	2.76 (1.07) 1-5	.15*	.21*	.09†	-					
5. Aggression T1	6.37 (6.26) 0-32	.30*	-.03	-.11*	.19*	-				
6. Aggression T2	6.38 (6.14) 0-30	.21*	-.01	-.06	.13*	.62*	-			
7. Change in Aggression (T2 - T1)	0.16 (5.36) -23 - 19	-.09†	.04	.01	-.04	-.39*	.46*	-		
8. Time spent playing violent games ^b	4.03 (4.06) 0.5-30.5	.01	-.02	-.10†	.07	.18*	.10†	-.08	-	
9. Gender ^c	- 0-1	-.01	-.02	-.03	.07†	.26*	.23*	-.02	.27*	

Note. $n = 448$ for all T1 variables; $n = 420$ for T2 variables.

^a Pearson's r correlations, converted from Kendall's tau- a correlations using Greiner's relation in Stata 12 (Newson, 2002).

^b Measured in hours.

^c Girls = 0; boys = 1.

* $p < .05$; † $p < .10$.

Violent game-induced responses and aggressive behavior (H1, H2, RQ1)

H1 predicted that higher cognitive effort during violent game play is related to increased aggression; H2 predicted that more positive valence in response to violent games is related to increased aggression; and RQ1 asked how violent game-induced arousal and aggression are related. Analyses controlled for gender and time spent playing violent games and adjusted for clustering.

Cross-sectional analysis (H1a; H2a; RQ1a)

In the cross-sectional model, cognitive effort invested in violent games was negatively related to aggressive behavior ($b = -.49$, $SE = .24$, $p = .038$, $b^* = -.09$), thus rejecting H1a. Valence in response to violent games was not significantly related to aggression ($b = -.67$, $SE = .42$, $p = .115$, $b^* = -.07$), thus rejecting H2a. In response to RQ1a, we found that violent game-induced arousal was positively related to aggression ($b = .99$, $SE = .27$, $p < .001$, $b^* = .17$).

Longitudinal analysis (H1b; H2b; RQ1b)

In the longitudinal model, none of the responses predicted change in aggressive behavior over time. Thus, H1b and H2b were rejected, and we did not find any significant longitudinal relationship between arousal and aggression in response to RQ1b.

Family conflict as predictor of violent game-induced responses and aggression (RQ2)

RQ2 asked whether family conflict predicts responses to violent games and subsequent aggression, and was tested as a mediation model using SEM. The model controlled for gender and time spent playing violent games and adjusted for clustering.

Cross-sectional analysis (RQ2a)

Model fit was good, as indicated by a CFI of 1.00 and an RMSEA of .00. Table 2 presents the results for the cross-sectional models. Family conflict predicted increased cognitive effort ($b = .22$, $SE = .09$, $p = .015$, $b^* = .11$) and increased arousal in response to violent game play ($b = .29$, $SE = .09$, $p = .002$, $b^* = .15$), but was not significantly related to valence ($b = -.078$, $SE = .06$, $p = .174$, $b^* = -.07$). The indirect path from family conflict to aggression via cognitive effort did not reach traditional levels of significance ($b = -.15$, $SE = .080$, $p = .069$, $b^* = -.01$). The indirect path via arousal was significant ($b = .20$, $SE = .10$, $p = .041$, $b^* = .018$). Overall, in response to RQ2a, the results provide support for a path between family conflict and aggression via violent game-induced arousal.

Longitudinal analysis (RQ2b)

To evaluate the longitudinal relationships between family conflict, responses to violent games, and aggression, our structural equation model was re-run with change in aggression as the outcome variable. Model fit was good, as indicated by a CFI of 1.00 and an RMSEA of .00. Neither family conflict nor the three responses were significantly related to change in aggression. Therefore, in response to RQ2b, there is no evidence for a longitudinal path from family conflict to increased aggression via violent game-induced responses.

Table 2 Cross-sectional mediation analyses (RQ2a)

Violent game-induced response (mediator)	Family conflict → Response			Response → Aggression			Indirect effect		
	<i>b</i>	<i>SE</i>	<i>b</i> *	<i>b</i>	<i>SE</i>	<i>b</i> *	<i>b</i>	<i>SE</i>	<i>b</i> *
Cognitive effort	.22*	.09	.11	-.65*	.22	-.12	-.15†	.08	-.01
Valence	-.08	.06	-.07	-.39	.39	-.04	.03	.04	.00
Arousal	.29*	.09	.15	.70*	.26	.12	.20*	.10	.02

Note. Controlling for gender and time spent playing violent games.

* $p < .05$; † $p < .10$.

DISCUSSION

This study investigated the relationships between cognitive, emotional, and excitative responses to violent games and adolescents' aggressive behavior outside the lab. In addition, we explored whether these responses are predicted by family conflict, a relevant social context variable related to media violence exposure and aggression. In the cross-sectional analyses, higher cognitive effort during violent game play was related to decreased aggression while higher arousal was related to increased aggression. No significant relationship was found between emotional valence during violent game play and aggression, nor was there support for longitudinal relationships between responses to violent games and change in aggression one year later. Looking at a potential predictor of violent game-induced responses and subsequent aggression, we found support for a cross-sectional indirect relationship between family conflict and aggression via increased arousal, although the indirect effect was small ($b^* = .02$). Family conflict also predicted increased cognitive effort, but the indirect effect on aggression was not significant. No longitudinal mediation effects on aggressive behavior one year later were found.

In all, the most consistent support was found for a positive cross-sectional relationship between violent game-induced arousal and aggression. The direction of this relationship is consistent with the idea of excitation transfer, which expects a positive relationship between these variables immediately after violent game play (Zillmann, 1991). Our study suggests that such a relationship may also exist beyond the game play situation. One explanation for how arousal during violent games may affect aggressive behavior at a later time is by affecting cognitive processes such as the speed of processing and memory of the violent game content (Ravaja, 2004), which may then translate into aggressive behavior after game play. Contrary to expectations, increased cognitive effort was related to *decreased* aggression in this study. Perhaps higher cognitive effort during a violent game reflects a more critical stance towards the game (Scharrer, 2006) rather than enhanced learning of aggression. A relevant follow-up to our study would be to more closely study cognitive processes in response to violent media, as well as to investigate how arousal affects such cognitive processes and subsequent aggressive behavior outside the lab.

A viable alternative explanation for the cross-sectional findings in this study is that already aggressive adolescents experience more arousal and less cognitive effort during violent game play. The absence of a longitudinal effect of violent game-induced responses on aggression one year later may be seen to suggest this. Yet, it is equally likely that any effects of such responses are simply not *that* long-lasting (Anderson et al.,

2010). In either case, the cross-sectional relationships found in this study indicate that it is relevant to investigate how responses to violent games and aggression are related outside an experimental setting. To better understand the direction of this relationship in real life, future research might rely on longitudinal set-ups with shorter intervals and cross-lagged relationships between response measurement and aggressive behavior.

Regarding the role of social context, we found that family conflict was cross-sectionally related to higher cognitive effort and higher arousal in response to violent games. In addition, a small but significant mediation path from family conflict to aggression via arousal was found. This is the first study to show that adolescents' social environment can affect the strength of their responses to violent games. Importantly, heightened responding to violent games as a result of the social environment may provide an explanatory mechanism for resonance or context-content convergence effects (Valkenburg & Peter, 2013a). For example, a previous study found that exposure to media violence was related to increased aggressive behavior among those adolescents who were growing up in a high conflict family (Fikkers et al., 2013). The results found in this study suggest that such a resonance effect may take place because those adolescents experience more *arousal* during violent game play. Future research that further looks into why and how adolescents in particular social contexts may respond more strongly to violent games would further enhance our understanding of resonance effects.

Theoretical implications

This study is a first attempt to understand how cognitive, emotional, and excitative responses to violent games relate to aggression outside an experimental setting. Next to providing empirical insight into these relationships and identifying relevant next questions for future research, an important take-away of this study is that there is a need for more theoretical specificity about the role of media responses in affecting real-life outcomes. Although several theories stress the central role of responses to media in media effects (Anderson & Bushman, 2002; Valkenburg & Peter, 2013a), we lack clear explanations about *how* such responses may ultimately contribute to behavioral outcomes such as aggression. This may be a consequence of the interdisciplinary nature of communication science, in which researchers often employ theories from other disciplines (e.g., psychology) in their work. While this interdisciplinary approach is a strength of the field, it can be problematic in that the main focus of such theories is often not on the media use process. For example, many media violence studies rely on the General Aggression Model (Anderson & Bushman, 2002). However, as a theory that focuses on an *outcome* of media violence exposure, the GAM can help guide

empirical studies into aggression, but is not sufficiently specific in its expectations to guide studies into the media violence process. It is important that communication scientists extend such theories and develop clear hypotheses about how particular media content results in particular processes *and* subsequent outcomes. As a starting point, we provide two questions that should be further explicated in order to understand whether and how responses to media violence may affect aggression.

First, one way to provide more specific explanations about responses to violent media is to integrate ideas from mediated message processing theories into current aggression models. Several theories explain in rich detail how specific media characteristics may influence processing of a message and subsequent cognitive outcomes (e.g., Fisch's [2000] capacity model; Lang's [2000] LC4MP). Media violence researchers can use this body of knowledge to posit and test expectations about which types of processing are evoked by which characteristics of violent messages, and whether and how this may trickle through to aggressive behavior. The recently proposed Theory of Vivid Media Violence (Riddle, 2014) is a good example of using media processing theories to explain how vivid media violence can affect attention, presence, emotional reactions, and cognitive elaborations of such content, and how that may relate to subsequent cognitive effects. More work that explicates *and* formally tests how responses to violent media may increase, decrease, or not affect aggressive behavior would result in improved understanding of this relationship.

Second, to fully understand how responses to violent media affect aggression outside the lab, we need more specific explanations about *when* violent media-induced responses are expected to relate to behavioral outcomes such as aggression, and when they are not. Right now, explanations about the role of media responses focus on either the immediate media use situation, or on the long term. This leaves unanswered several questions about the effects of responses in single versus repeated exposure as well as all time lags in between "immediate" and "long term." For example, studies have shown that arousal in response to a violent game diminishes when people play longer (Krcmar & Lachlan, 2009) or repeatedly over the course of four days (Grizzard et al., 2015). Does this mean that aggressive behavior as a result of such arousal diminishes as well? Or do we expect that the *effect* of such arousal diminishes, but that other potential aggressive-enhancing mechanisms take over? These are valid questions that may also be asked for cognitive and emotional responses to violent media. Taking on these questions by developing clear expectations about the time frame of effects of media responses will help refine and advance media violence research.

Methodological implications

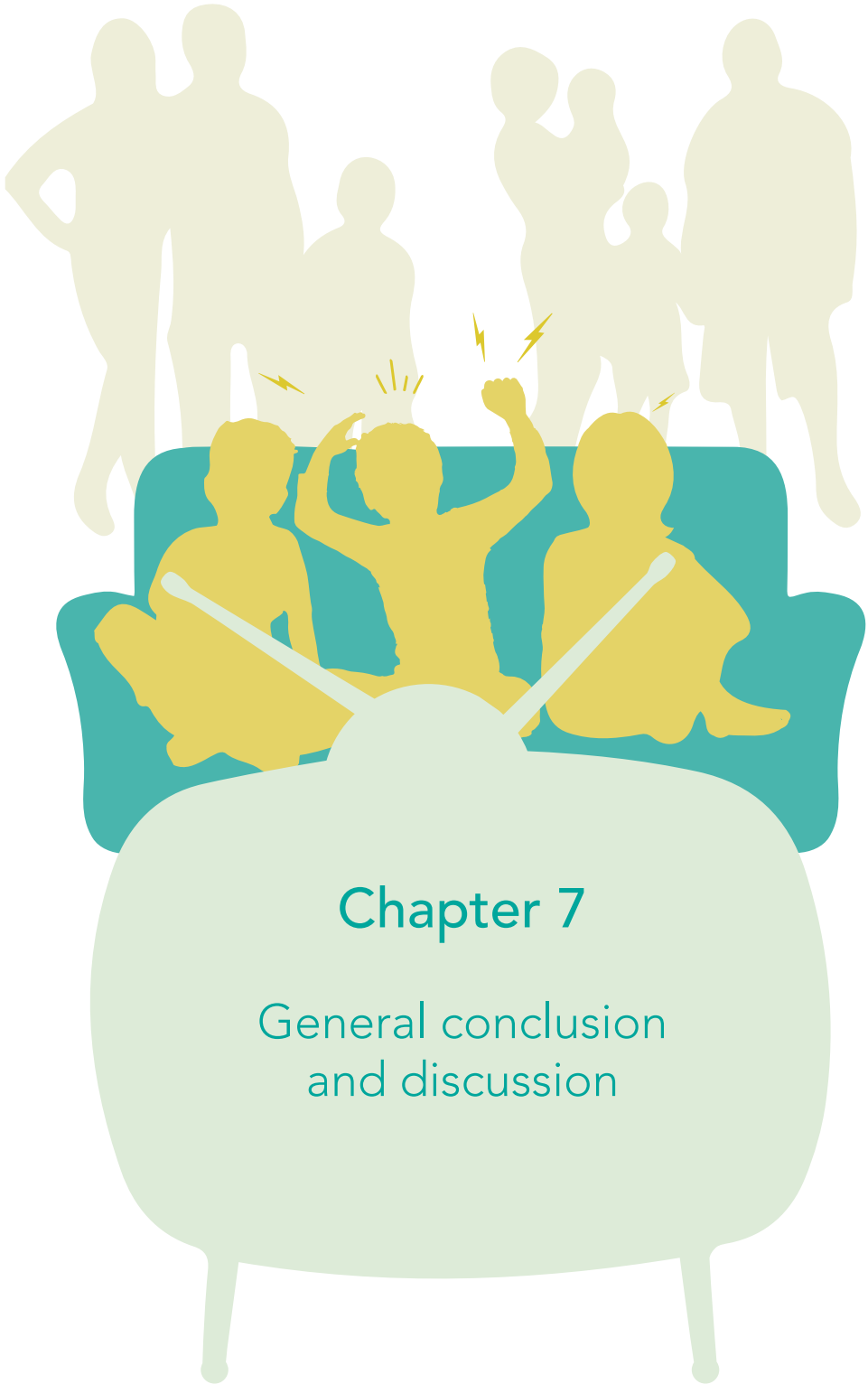
Next to further theoretical specification, methodological innovation is necessary in order to answer questions about responses to media in the best possible way. In our study, we used media diaries to measure responses to violent games, and surveys to measure aggression and individual differences. This approach offers several advantages, such as the possibility to survey a large sample, an ecologically valid measurement of violent game-induced responses, and the possibility to test longitudinal relationships. In addition, the self-report measures of responses to games were less intrusive compared to physiological measures, which is an important issue to take into account with younger respondents.

At the same time, no method is free from weaknesses, and our study gives rise to two suggestions for future research. First, our response measurement relied on recalled and self-reported answers rather than directly observed responses. Physiological response measurement gives researchers more control over the exposure situation and response measurement, which enhances internal reliability, but also generally means smaller sample sizes and shorter duration of exposure. Ultimately, we need both methods in order to understand how media exposure, responses, and behavior are related to each other both in and outside the lab (Ravaja, 2004). Relevant future studies that combine “lab” and “real world” data could move beyond the limitations of either method (see e.g., Krahé et al., 2011). Furthermore, it is relevant for future work to consider naturalistic response measurement that relies less on recall, such as experience sampling (Kubey & Larson, 1990) or ambulatory measurement (Myrtek, Scharff, Brugner, & Muller, 1996).

Second, using more fine-grained analyses will generate more complete knowledge about media responses. In this study, we used aggregated scores for the cognitive, emotional, and excitative responses. However, responses can differ between and even within games, as shown by several studies who studied moment-to-moment physiological responses combined with an event-related analysis of violent games (Lang et al., 2012; Weber, Behr, Tamborini, Ritterfeld, & Mathiak, 2009). This fits with the idea of media use as a dynamic process in which responses and media content reciprocally and dynamically influence each other (Wang, 2014). Future research should measure *and* analyze in much more detail the processes during violent media exposure, how these differ within and between games (as well as within and between respondents), and how they relate to aggression.

Conclusion

This study aimed to step outside the lab and explore how cognitive, emotional, and excitative responses to violent games relate to adolescents' aggressive behavior, as well as how these responses may originate from a social context variable such as family conflict. Our findings show that more attention to *responses* to violent media is justified and necessary for understanding the relationship between media violence and aggression in adolescents' lives. However, if we want to study responses to violent media, their consequences, and their origins in a meaningful way, the field must develop more specific theoretical explanations for these relationships as well as think about the best way to measure and test them. Shifting the focus from outcome variables such as aggression to the "black box" of responses to violent media use will be a crucial steppingstone towards understanding the process of media effects.



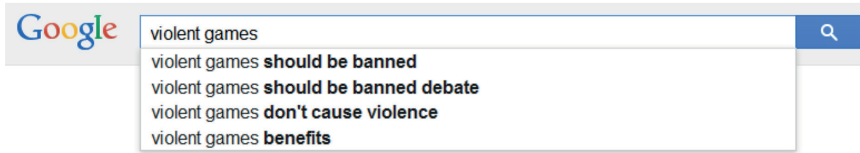
Chapter 7

General conclusion
and discussion

All grown-ups were children first
(but few of them remember it).

de Saint-Exupéry (1943)

For whom does media violence exposure lead to aggression?



Google print screen, July 10, 2015

There is a wide range of perspectives among parents, children, journalists, and professionals about what a relationship between media violence exposure and adolescents' aggression may look like. For some, it is clear as daylight that the abundance of violence in the media must have negative consequences – after all, so many movies and games contain violence these days, even those specifically aimed at youth audiences such as *The Hunger Games*, *Divergent*, and *Maze Runner*. For others, it is equally logical that media violence does not affect teens' behavior – after all, given the popularity of violent games and television shows, wouldn't we have chaos and anarchy if such media content made people more aggressive? A similarly wide range of perspectives about whether media violence affects adolescents' aggression is found among academics (see e.g., Bushman & Huesmann, 2014; Elson & Ferguson, 2014a). This dissertation explored whether the “truth” (if it exists) may lie somewhere in the middle by investigating whether media violence exposure may influence aggressive behavior for *some* adolescents, and if so, for whom. Specifically, the studies in this dissertation explored whether characteristics of the social context (family, parents, peers) make some adolescents more and others less susceptible to media violence effects on aggression (known as social susceptibility, Valkenburg & Peter, 2013a). Together, the collection of studies provides five conclusions about the relationship between media violence exposure and early adolescents' aggression.

1 Media violence exposure does not lead to an increase in aggression over time for *all* adolescents.

First, when looking across all adolescents in our sample, media violence exposure was not related to increased aggressive behavior over time. Although each chapter found a medium-sized cross-sectional relationship between media violence and aggression (around $r = .30$), this relationship did not remain in longitudinal analyses that tested

whether media violence exposure at one time point was related to increased aggressive behavior four months (chapter 3) or one year later (chapter 4 and 5). Overall, then, this dissertation does not provide evidence for universal and direct effects of media violence on aggression over time. Although this finding is more in line with skeptics' view of media violence effects (e.g., Elson & Ferguson, 2014b) than with those who propose that media violence is an important risk factor for aggression (e.g., Bushman & Anderson, 2015; Krahe, 2014a), this dissertation does not take the lack of universal longitudinal effects to mean that media violence exposure is trivial. Indeed, the central premise of this dissertation was precisely that *not all* adolescents will respond to media violence in the same way and, thus, that conclusions based on average effects may be an oversimplification and a potential misinterpretation of such findings (Valkenburg & Peter, 2013a, 2013b). To that end, this dissertation moved beyond universal effects and focused on differential effects.

2 Effects of media violence on increased aggression do exist for some adolescents: They are more pronounced for youth growing up in negative social contexts.

Second and more importantly, then, this dissertation illustrates that media violence effects do exist for subsamples of early adolescents. Specifically, chapters 3 and 5 indicated that media violence is related to increased aggression for those adolescents who grow up in families with more conflict, or in peer groups where aggression is perceived to be more common. These findings are consistent with the proposition of the Differential Susceptibility to Media Effects Model (Valkenburg & Peter, 2013a) that media effects are conditional and can depend on social susceptibility variables. More specifically, these findings provide empirical support for the theoretical concepts of resonance (Gerbner, Gross, Morgan, & Signorielli, 1980) and context-content convergence (Valkenburg & Peter, 2013a). These concepts propose that media may have more pronounced effects when media content matches with experiences in a person's social environment. This dissertation shows that this is indeed the case: Adolescents who grow up in a "negative" social environment are more susceptible to violence in games and television programs – they have an increased likelihood of becoming more aggressive over time.

3 For adolescents in neutral or positive social environments, media violence may lead to *less* aggression.

Surprisingly, this dissertation also found patterns suggesting that adolescents in neutral or positive social environments (that is, environments in which aggressive behavior is not common) may become *less* aggressive as a result of media violence exposure. In both chapters 3 and 5, media violence exposure was either not significantly related to aggressive behavior, or was related to decreased aggression for adolescents who experienced no conflict in their family or aggression in their peer group. This suggests that, in addition to resonance or context-content convergence effects, *dissonance* or context-content *divergence* effects may take place when an adolescent's social context does not match with the media content he or she uses. Although empirical research into differential media effects tends to focus on how negative media effects may be worsened by individual differences, this dissertation indicates that it is also worthwhile to explore how positive social contexts may help to reverse such media effects (cf. Piotrowski & Valkenburg, 2015).

Interestingly, one of the most often investigated "positive" social context factors in media effects research – parental mediation – did relatively little to reduce aggression as outcome of media violence exposure. Chapter 4 investigated two parental mediation strategies (restrictive and active mediation) communicated in different styles (autonomy-supportive, controlling, and inconsistent). Although often thought to be an effective tool against adverse media effects (Cantor & Wilson, 2003), active mediation did not affect the relationship between media violence and adolescents' aggression, regardless of the style in which it was communicated. Restrictive mediation did influence media violence exposure and aggressive behavior, albeit only cross-sectionally and not over time. Specifically, autonomy-supportive restriction was related to lower, and inconsistent restriction to higher media violence exposure and aggression. Perhaps counter to popular belief, chapter 4 offers some support for the idea that parental restriction of violent media use may be a good thing – when communicated in a way that takes the perspective of the child seriously. In the long run, however, other positive social context factors such as direct modeling of prosocial behavior by parents, siblings, and peers (Padilla-Walker & Carlo, 2014) or high-quality relationships with peers and parents (Laible, 2007) may prove more effective in reducing a relationship between media violence exposure and adolescents' aggression, and therefore merit further attention.

4 Adolescents' social context changes the relationship between media violence and aggression by influencing how media violence exposure is *experienced*.

In addition to showing that the relationship between media violence exposure and aggression is not the same for all adolescents, this dissertation shows that this relationship may vary because adolescents in different social contexts *respond* to media violence in different ways. For example, chapter 5 showed that media violence had a different effect on perceptions of peer approval of aggression depending on how common aggression was in an adolescents' peer group. For those adolescents who believe that aggression is very common among their peers, media violence *increased* their belief that their friends approve of aggression, and this belief was subsequently related to increased aggression. Conversely, for those adolescents who did *not* think that aggression was common among their peers, media violence *decreased* their belief that their friends approve of aggression. As a result, they became less aggressive over time. Chapter 6 investigated cognitive, emotional, and arousal responses to violent games and whether these may be predicted by family conflict. Results demonstrated that family conflict was cross-sectionally related to higher arousal in response to violent games and higher aggressive behavior. In other words, adolescents who experienced more conflict in their family environment also experienced higher arousal when playing a violent game. Because higher arousal in response to violent game play was related to higher aggression, this increased responding to violent games could explain the "double dose" or resonance effect found in chapter 3 of this dissertation. The reason that adolescents growing up in high conflict families become more aggressive when exposed to media violence (chapter 3) may be because they experience stronger arousal responses to such content (chapter 6). Together, chapters 5 and 6 show *why* media violence influences the aggressive behavior of adolescents in different social contexts in different ways.

5 Media violence exposure can be validly assessed among adolescents with self-report measures – but we still have a long way to go.

Last (but not least), this dissertation showed that media violence exposure can be validly measured among adolescents using self-report measures – with two caveats. First, the quality of self-report measurement depends on the type of measure used and the type of medium under scrutiny. Chapter 2 compared two frequently used self-

report measures of media violence exposure: direct estimates and favorite media titles (user-rated and agency-rated). Direct estimates – a measure that asks adolescents to report the number of days per week and hours per day spent using violent media – were found reliable and valid for measuring exposure to violent content on television and in games. Alternatively, asking adolescents for their three favorite games and television shows, how frequently they play them, and then assessing how much violence these media contain, was reliable and valid only for exposure to violent games but not violent television programs. Thus, researchers who are interested in exposure to violent media (often operationalized as violent games and television) are best off using direct estimates. For violent game-only studies, both direct estimates and favorites can be used. As a second caveat, however, although self-report measurement of media violence exposure *can* be reliable and valid, it is crucial that researchers in this field think about how to further improve such measures. Currently, the measures evaluated in this dissertation can be described as “sufficient” at best. Given that our ability to detect and interpret effect sizes depends directly on the quality of measurement, efforts to improve and standardize self-report measures of media violence exposure will be vital for this field to take the next step towards understanding the effects of media violence.

What do these findings mean in real life?

In March 2015, parents of children in 16 schools in the United Kingdom received a letter from their head teachers stating that if parents allowed their child to “have inappropriate access to any game or associated product that is designated 18+, we are advised to contact the police and children’s social care as this is deemed neglectful” (Khomami, 2015). This example illustrates the sometimes dramatic calls for action related to children’s violent media use. In a world where violent content is part and parcel of media entertainment (Bleakley, Jamieson, & Romer, 2012; Smith, Nathanson, & Wilson, 2002; Smith, Lachlan, & Tamborini, 2003), where horrific real-world acts sometimes seem inspired by such media content (Pidd, 2012), and where parents are confronted with fear- and guilt-inducing advise about media, it is not strange that parents worry about their children’s use of violent media. The multitude of media education websites (e.g., mediaopvoeding.nl; Ask the Mediatrixian) where parents ask questions about the appropriateness of violent media for their children testifies to this fact and indicates a need from parents as well as practitioners to know how harmful media violence exposure really is. The million dollar question, then, is to what extent we should worry about media violence exposure in childhood and adolescence, and what stakeholders involved can do. This dissertation shows that there are two sides

to the coin of differential media violence effects, and provides two “real world” take-aways for people concerned about children’s behavior.

First, **for the majority of children and adolescents, media violence exposure is not directly problematic.** Most of the 10- to 14-year-olds who participated in this study did not become more aggressive over time as a consequence of violent media use. This dissertation therefore does not indicate a need for large-scale, one-size-fits-all interventions to ban violent games from the stores or to encourage all parents to prohibit their children’s violent media use. Parents need not feel guilty or concerned when their children enjoy violent media entertainment in reasonable amounts. It is good to keep in mind that, for most youth, violent game play and violent television viewing are part of normal development (Olson, 2010). In addition, violent media are often attractive for reasons other than the presence of violent content (Olson, Kutner, & Warner, 2008; Valkenburg & Cantor, 2000). For example, *Grand Theft Auto* certainly contains plenty of violence, but also offers players the freedom to discover an immense game world that includes social and political commentary and satire (Miller, 2013; Ruch, 2012). *Game of Thrones* is one of the most violent television series to date, but with an average budget of six million dollar per episode (Jacobson, 2014), the series also offers an extremely high quality viewing experience. Although it is often all too easy to focus on the negative, an important take-away for parents, practitioners, and academics is not to lose sight of what violent media may offer youth besides the violent content (Jansz, 2005; Ruch, 2012). At the same time, this dissertation does not suggest that children should binge on violent media or that parents should simply allow any type of content. Even if parents need not directly worry when their child wants to play *Assassin’s Creed* or is interested in *The Walking Dead*, it remains important for parents to play a guiding role in their children’s media use. The adage “too much of anything is always a bad thing” applies here, too, and children may not always be ready for certain content from a developmental perspective. Parents are in the best position to evaluate whether certain content is appropriate for *their* individual child. To achieve this, parents can learn more about violent media entertainment through rating systems such as Kijkwijzer and PEGI (Pan European Game Information), by trying media themselves (perhaps together with their children), and use their own expertise as a parent to determine whether the content is right for their child.

Second, **concerns about media violence exposure are warranted for youth growing up in adverse social contexts.** For adolescents growing up in high conflict families or who perceive high aggression among their peers, media violence may be an additional risk factor for aggressive behavior. This group of adolescents deserves special attention from health care practitioners and teachers, who are in the position

to help these youth and their families identify ways to prevent or reduce adverse outcomes. From a practical perspective, however, it is important to recognize that even for these more vulnerable adolescents, the effect of media violence on aggression was small, both in terms of absolute size and relative to the social context factors studied here. This means that when the goal is to reduce an adolescent's aggressive behavior, more ground can be gained by changing these social context factors than by changing media violence exposure. Realistically, however, it is also likely more difficult to change social context factors than it is to change media violence exposure. Given that aggressive behavior is often the result of several factors (Ribeaud & Eisner, 2010), health care professionals will likely rely on multiple routes to behavior change when helping aggressive youth and their families. For these stakeholders, it is relevant to know that attempts to reduce media violence exposure (especially when done in an autonomy-supportive way) may be a small but significant step in the right direction for youth in difficult circumstances.

Where do we go from here?

The relationship between media violence exposure and aggressive behavior has been studied and debated for nearly a century, and will likely continue to be debated for years to come. The conclusions of this dissertation neither solve this debate nor provide a definitive answer on the media violence-aggression relationship. What this dissertation does do is add a new perspective to the debate by focusing on the question of *who* is most susceptible to media violence. Specifically, guided by the Differential Susceptibility to Media Effects Model (Valkenburg & Peter, 2013a), this dissertation tested and supported the idea that different adolescents may be affected by media violence in different ways depending on their social context.

As with all research, it is important to consider some limitations when interpreting these findings. For example, this dissertation relied on survey research and can therefore not formally establish causal claims. However, because of its longitudinal nature, the dissertation still offers meaningful insight into patterns of relationships within a broader social context. Another limitation inherent to this type of research is that it relied on single respondents' self-report for all study variables, which may enable particular response patterns, biases, or mischievous responding (Ferguson, Garza, Jerabeck, Ramos, & Galindo, 2013). However, because the main question items in this study were embedded within a larger survey and the sample was very large, it is unlikely that the results found in this dissertation are due to particular response patterns among a few adolescents. Lastly, the sample surveyed in this dissertation consisted of Dutch families with typically developing early adolescents (that is, a

WEIRD sample - Western, Educated, Industrialized, Rich, and Democratic, Henrich, Heine, & Norenzayan, 2010). These findings may not necessarily translate to children and families in different cultures or to youth who grow up in more severe negative circumstances (although it may be expected that such youth are even more strongly affected).

Together, the insights learned throughout the five empirical chapters indicate several next steps that media violence researchers – and media effects researchers more generally – may take to move our field forward and come closer to understanding the fickle nature of media effects. A first implication that follows logically from this dissertation is that it is meaningful and necessary to investigate individual differences and underlying mechanisms in media effects. Meaningful because such a more comprehensive approach to investigating media effects more closely matches with theoretical predictions as well as with how we experience media effects in real life (Valkenburg & Peter, 2013a, 2013b). Necessary because not considering differential processes and effects can result in invalid conclusions about media effects (as illustrated by chapter 5 in this dissertation and previously noted by Valkenburg & Peter, 2013a, 2013b). Although increasingly complex models of media effects can at some point become counterproductive, it is clear that testing universal and direct effects is only partially informative, especially in a mature field such as media violence research. Further empirical research that conceptualizes and tests the complex constellation of relationships among individual differences, media use, mechanisms, and outcomes is necessary to fully understand the role of media in adolescents' lives. More specifically, future research may investigate (combinations of) multiple social, dispositional, and developmental susceptibility variables to gain a more complete understanding of the type of user that is most vulnerable to media effects. Other contributions to theory development can be made by research that investigates differential *processes*, asking how a media-outcome relationship may be mediated in different ways for different individuals (Slater & Gleason, 2012). Lastly, although this dissertation only focused on the effects-side of the story, it is important to explore differential *selection* processes as well (cf. Slater, 2007; von Salisch, Vogelgesang, Kristen, & Oppl, 2011). Such research should not only consider disposition as predictor of media use (as is most common), but also biological, developmental, and environmental influences (Elson & Ferguson, 2014b; Valkenburg & Peter, 2013a).

Second, this dissertation shows that more attention for the role of social context in media effects research is justified. Although it is only natural that media effects research typically zooms in on the specific role of media, children and adolescents do not play violent games or watch violent programs in a social vacuum (Jordan, 2004). Several

theoretical models can guide research into social context factors in media research (Jordan, 2004; Slater, 2007; Valkenburg & Peter, 2013a), and although this dissertation provides an empirical starting point, there is still plenty of ground left to cover. Future research can examine other relevant social contexts such as children's school environment or their siblings (cf. Hornik, 2006), as well as other characteristics of peers and parents such as their own (violent) media use (cf. Bleakley, Jordan, & Hennessy, 2013) or joint media use (Velez, Greitemeyer, Whitaker, Ewoldsen, & Bushman, 2014). This dissertation provides initial evidence that media violence is related to increased *and* decreased aggressive behavior depending on the social context of the adolescent. In addition to replicating these findings, relevant next steps would be to understand *how* this process may work. A key question that needs answering is how children integrate messages from different contexts that may promote different norms, such as their family, peers, school, or (violent) media (Arnett, 1995). Given that children in middle childhood start to distinguish between fact and fiction (Valkenburg, 2014), one may wonder what they take away from (violent) media entertainment, especially when those messages are not in sync with what they see in their real environment. Future research that attempts to understand media (violence) effects not in isolation but in the broader context of children's lives will help us understand why some children may be vulnerable and others resilient to adverse media effects (Jordan, 2004).

Third, research into media violence and aggression may benefit from incorporating insights learned in communication and entertainment research. Media violence research often relies on the General Aggression Model (GAM, Anderson & Bushman, 2002), which, as a theory of aggression, is aimed at explaining how and for whom aggressive behavior is more likely. Although media violence exposure has a place in this model (as a possible "input" variable), the GAM takes a relatively narrow view on media violence exposure, and is not very specific about how media violence may trickle through to real-life aggression. For example, the GAM proposes that violent media use evokes aggressive thoughts, aggressive feelings, and arousal that may increase aggression. These variables are logical when predicting aggressive behavior, but overlook the many (and also positive) experiences that media users may have while using violent entertainment (as noted in chapter 6 of this dissertation). For example, media entertainment researchers have posited several other processes that are relevant for understanding how media violence is experienced, such as enjoyment (Hoffner & Levine, 2005; Vorderer, Klimmt, & Ritterfeld, 2004), identification (Konijn, Nije Bijvank, & Bushman, 2007), empathy (Vossen, Piotrowski, & Valkenburg, 2015), eudaimonic appreciation (Bartsch & Mares, 2014), and moral disengagement (Hartmann, Krakowiak, & Tsay-Vogel, 2014). These processes are not commonly

included in traditional studies into the media violence-aggression relationship, but may provide relevant new insights into why people experience increases, decreases, or no changes in aggression. Researchers in this field should therefore take advantage of the rich knowledge offered by entertainment research to cast a wider net around violent entertainment. By paying more attention to the media-part of the aggression-equation, this field can be taken to a new level.

Lastly, a key way to advance media violence research is to collectively invest in conceptualizing, designing, and evaluating improved self-report measures for media violence exposure, in youth as well as adult audiences. Apart from the usual limitations associated with self-report measures (Schwarz & Oyserman, 2001), a key problem of current media violence exposure measures is that they operationalize violent content mostly as “present or absent” (either as a dichotomy or on a scale from “not at all” to “a lot,” Ferguson et al., 2013). This overlooks the fact that violent content comes in many forms and contexts (e.g., more or less explicit, human or non-human characters, Smith et al., 2002; Smith et al., 2003) as well as the notion that particular types of violence are theoretically expected to result in stronger effects (e.g., justified or realistic violence, Bandura, 2009; humorous violence, Potter & Warren, 1998). If we can better match self-report measures of media violence exposure to the types of content that are theoretically expected to be most problematic, that should greatly improve the predictive power of research (Slater, 2004). Importantly, improved measurement should also help researchers in this field (on either side of the debate) to offer more convincing answers about the “true” effects of media violence. One avenue that can be worthwhile to explore is to supplement questions about *time* spent using violent content with questions about specific *attributes* of that content. For example, experimental studies have shown that viewers’ perceptions of justification, realism, and graphicness of violence predicted their perceptions about *how much* violence a television program or game contained (Breuer, Scharnow, & Quandt, 2014; Potter & Tomasello, 2003; Tamborini, Weber, Bowman, Eden, & Skalski, 2013). In fact, these perceived characteristics explained more variance in judgments about violent content than the “objective” amount of violent content as determined by the researchers. It would be worthwhile to investigate whether and how the inclusion of such viewer interpretations in surveys may help improve self-report measurement of media violence exposure. If found reliable and valid, including additional questions about theoretically relevant attributes of media violence in survey research may be a feasible way to learn more about which type of media users have which type of interpretations of violent content, and as a consequence may experience changes in aggressive outcomes.

Conclusion

This dissertation aimed to investigate *which* early adolescents become more aggressive as a result of media violence exposure, rather than assuming that such effects are present or absent for all youth. Although the rhetoric surrounding media violence effects seems to suggest that effects are either large and important, or small and unimportant, the conclusion of this dissertation is that media violence can have a small yet meaningful effect on youths' aggressive behavior. Adolescents in negative social contexts become slightly more aggressive over time as a result of playing violent games and watching violent television shows. On the other hand, adolescents growing up in normal or positive social environments tended to show no change in or even *less* aggressive behavior as a result of media violence exposure. This shows that there is no one-size-fits-all answer to media effects questions. Instead, it is more meaningful – theoretically, empirically, societally – to acknowledge the complex ways in which media play a role in children's lives. By applying a different(ial) perspective to the classic question of media violence and aggression, this dissertation offers important new insights and a step towards a more balanced understanding of media violence effects.

~ The End ~



English summary
Nederlandse samenvatting
References
Author contributions
Dankwoord
About the author

ENGLISH SUMMARY

A different(ial) perspective: How social context influences the media violence-aggression relationship among early adolescents

Does violence on television and in games make teens more aggressive? The answer to this question is subject to passionate debates among parents, children, journalists, and academics. Some of them are convinced that kids become more aggressive after playing *Call of Duty* or *Grand Theft Auto*, and others are equally convinced that this is not the case. These discussions often implicitly assume that media violence will influence all youth in the same way: Either (all) teens become more aggressive, or they (all) don't. But this does not really match with our everyday experience of media effects, where simply not everyone gets emotional when watching *Love Actually* or aroused when watching *Die Hard*. This is because there are many differences among teens, such as in their disposition, developmental level, or social context. It doesn't seem logical, then, to expect that effects of media violence exposure are the same for all teens (Valkenburg & Peter, 2013a, 2013b). Instead, it is better to ask *which* teens become more aggressive as a result of media violence exposure. That was the main aim of this dissertation. Rather than assuming that the effect of media violence on aggression is the same for everyone, this dissertation investigated whether *some* adolescents are more vulnerable to media violence. To that end, we investigated the social context of adolescents – their family, parents, and peers – and how this influences the relationship between media violence and aggression.

Conclusions

For this dissertation, a large-scale study was set up in which circa 500 Dutch families with children between 10 and 14 years old were tracked for several years. The dissertation reports the results of five empirical studies. Together, these studies provide five main conclusions about the relationship between media violence and aggression:

1. Media violence exposure does not lead to an increase in aggression over time for *all* adolescents.
2. *Some* adolescents do become more aggressive as a result of playing violent games or watching violent television programs. Specifically, media violence was related to increased aggression among teens who are growing up in a high conflict family or who perceive much aggression in their peer group.
3. Other teens may even become *less* aggressive as a result of media violence

exposure. Among teens in positive or neutral social contexts (environments without aggression in the family or peer group), media violence exposure was either not related to aggression, or related to *lower* aggression at a later time.

4. The reason that some teens become more, and others less aggressive as a result of media violence exposure is because teens in different social contexts *experience* such media content in different ways. For example, teens in high conflict families experienced more arousal during violent game play, which was related to higher aggressive behavior. Among youth with many aggressive friends, media violence increased their perception that these peers approve of aggression. On the other hand, youth whose friends were not aggressive thought that their friends would be *less* approving of aggression. These differences in perception were related to increased versus decreased aggressive behavior, respectively.
5. Lastly, this dissertation showed that measures in which adolescents themselves estimate the amount of time spent with media violence are valid ways of assessing such exposure. Still, there is plenty of room left for improvement.

These findings show that it is meaningful and necessary to consider differences between media users when studying media effects. This helps us to better grasp the subtle nature of media effects in teens' lives. In addition, this dissertation shows that more attention for the role of social context in media research is justified.

Practical implications

Practically, this dissertation provides two take-aways for parents, teachers, and other people involved in children's behavior. First of all, **media violence exposure is not directly problematic for the majority of children and adolescents**. Most of the teens surveyed in this dissertation did not become more aggressive over time as a result of violent game play or violent TV viewing. Therefore, this dissertation does not indicate a need for large-scale, one-size-fits-all interventions in which violent games are banned from stores or parents are encouraged to prohibit all violent media content. At the same time, this dissertation does not suggest that youth should endlessly binge on violent games and television programs. The adage "too much of anything is always a bad thing" certainly applies here too, and children may not always be ready for certain content from a developmental perspective. It remains important for parents to play a guiding role in their children's media use, because they are in the best position to evaluate whether certain content is appropriate for *their* individual child. To achieve this, parents can learn more about violent media entertainment through rating systems such as Kijkwijzer and PEGI (Pan European Game Information), by trying media themselves (perhaps together with their children), and use their own expertise

as a parent to determine whether the content is right for their child.

Second, **concerns about media violence exposure are warranted for youth growing up in negative social environments.** Media violence exposure is an additional risk factor for adolescents in high conflict families or aggressive peer groups. However, the effect of media violence on aggression was quite small even in these vulnerable groups. Still, for teachers and health care professionals working with these teens and their families it is good to know that reducing media violence exposure (especially when done in dialogue with the teen) can be a small but helpful step in the right direction.

This dissertation contributes to the scientific literature and the public debate by investigating *which* early adolescents become more aggressive as a result of media violence exposure, rather than assuming that such effects are present or absent for all youth. Although the rhetoric surrounding media violence effects seems to suggest that effects are either large and important, or small and unimportant, the conclusion of this dissertation is that media violence can have a small yet meaningful effect on youths' aggressive behavior. Adolescents in negative social contexts become slightly more aggressive over time as a result of playing violent games and watching violent television shows. On the other hand, adolescents growing up in normal or positive social environments tended to show no change in or even *less* aggressive behavior as a result of media violence exposure. This shows that there is no one-size-fits-all answer to media effects questions. Instead, it is more meaningful – theoretically, empirically, societally – to acknowledge that media plays a complex role in children's lives. By applying a different(ial) perspective to the classic question of media violence and aggression, this dissertation offers important new insights and a step towards a more balanced understanding of media violence effects.

NEDERLANDSE SAMENVATTING

Een differentieel perspectief: De invloed van sociale context op de relatie tussen mediageweld en agressie onder jonge adolescenten

Worden tieners agressiever van geweld op televisie en in games? Over het antwoord op deze vraag wordt heftig gediscussieerd door ouders, kinderen, journalisten en wetenschappers. Sommige van hen zijn overtuigd dat tieners inderdaad agressiever worden van het spelen van *Call of Duty* of *Grand Theft Auto*, terwijl anderen even overtuigd zijn van het tegendeel. Tijdens deze discussies gaat men er vaak impliciet vanuit dat mediageweld alle jongeren op dezelfde manier beïnvloedt: Of (alle) jongeren worden agressiever, of ze worden dat (allemaal) niet. Maar dit komt niet overeen met onze alledaagse ervaring met media-effecten, waarbij nu eenmaal niet iedereen even emotioneel wordt van *Love Actually* of even opgejut wordt door *Die Hard*. Dit komt doordat er veel verschillen zijn tussen jongeren in bijvoorbeeld hun temperament, ontwikkelingsniveau, en sociale context. Het is daardoor niet zo logisch om te verwachten dat mediageweld alle tieners op dezelfde manier raakt (Valkenburg & Peter, 2013a, 2013b). Het is eigenlijk beter je af te vragen welke jongeren agressiever kunnen worden van mediageweld. Dit was het belangrijkste doel van dit proefschrift. In plaats van aan te nemen dat het effect van mediageweld op agressie voor iedereen hetzelfde is, onderzoekt dit proefschrift of sommige adolescenten kwetsbaarder zijn voor mediageweld. Daarbij keken we naar de sociale omgeving van adolescenten – hun familie, ouders en vriendjes – en hoe dit de relatie tussen mediageweld en agressie beïnvloedt.

Conclusies

Voor dit proefschrift is een grootschalig onderzoek opgezet waarbij zo'n 500 Nederlandse gezinnen met jongeren tussen de 10 en 14 jaar meerdere jaren werden gevolgd. Dit proefschrift bevat de resultaten van vijf wetenschappelijke artikelen die samen aanleiding geven tot vijf conclusies over de relatie tussen mediageweld en agressie:

1. Mediageweld leidt niet voor *alle* adolescenten tot een toename in agressief gedrag.
2. *Sommige* adolescenten worden wel agressiever door het spelen van gewelddadige games en het kijken van gewelddadige televisieprogramma's.

Bij jongeren die opgroeien in een gezin met veel conflict en bij jongeren die veel agressie ervaren onder hun vriendjes hing mediageweld samen met meer agressief gedrag.

3. Andere jongeren lijken juist *minder* agressief te worden van mediageweld. Voor jongeren in een positieve of neutrale sociale context (een omgeving zonder agressie in het gezin of in de vriendengroep) hing mediageweld niet samen met agressie, of zelfs met *minder* agressie op een later moment.
4. De reden dat sommige jongeren meer, en anderen minder agressief worden door mediageweld is dat jongeren in verschillende sociale contexten zulke media-inhoud verschillend ervaren. Zo voelden tieners in gezinnen met veel conflict meer opwinding (arousal) tijdens het spelen van gewelddadige games, en dit hing samen met meer agressie. Bij jongeren met veel agressieve vrienden hing mediageweld samen met een sterkere perceptie dat hun vrienden agressie goedkeuren. Maar jongeren waarvan de vrienden niet agressief waren, dachten juist dat hun vrienden agressie *minder* goedkeuren als gevolg van mediageweld. Deze verschillen in perceptie hingen vervolgens samen met respectievelijk meer en minder agressief gedrag.
5. Als laatste laat dit proefschrift zien dat meetinstrumenten waarin adolescenten zelf inschatten hoeveel mediageweld ze gebruiken, geschikt zijn om blootstelling aan mediageweld te meten. Er is echter wel nog ruimte voor verbetering.

Deze bevindingen laten zien dat het zinvol en noodzakelijk is om rekening te houden met verschillen tussen mediagebruikers in onderzoek naar media-effecten. Zo kunnen we beter begrijpen hoe subtiele media-effecten plaatsvinden in het echte leven. Daarnaast geeft dit proefschrift aan dat meer aandacht voor de rol van sociale omgeving in media-onderzoek gegrond is.

Aanbevelingen voor de praktijk

Voor de dagelijkse praktijk van bijvoorbeeld ouders, docenten en andere professionals die met kinderen omgaan, levert dit proefschrift twee aanbevelingen op. **Ten eerste is mediageweld niet direct problematisch voor de meerderheid van kinderen en adolescenten.** De meeste kinderen die meededen aan dit onderzoek werden met het verstrijken van de tijd niet agressiever door het spelen van gewelddadige games of kijken naar gewelddadige televisieprogramma's. De resultaten geven dus geen aanleiding tot grootschalige *one-size-fits-all* interventies waarin gewelddadige games uit de winkels worden verwijderd of ouders worden aangemoedigd om mediageweld te verbieden. Tegelijkertijd suggereert dit proefschrift ook niet dat kinderen eindeloos gewelddadige games en televisieprogramma's kunnen gebruiken. Het gezegde "alles

waar te voor staat, is slecht” gaat ook hier op, en kinderen zijn soms nog niet klaar voor bepaalde inhoud vanwege hun leeftijd. Het is daarom belangrijk dat ouders optreden als begeleiders van het mediagebruik van hun kinderen, omdat zij zich in de beste positie bevinden om te beoordelen of bepaalde inhoud geschikt is voor *hun* kind. Om dit te bereiken kunnen ouders proberen meer te weten te komen over de media die hun kinderen willen gebruiken, bijvoorbeeld door beoordelingssystemen als Kijkwijzer of PEGI (Pan European Game Information) te gebruiken, of media zelf te gebruiken (bijvoorbeeld samen met hun kinderen), en door hun eigen expertise als ouder in te zetten.

Ten tweede zijn zorgen over mediageweld wél gegrond voor jongeren die in een negatieve sociale omgeving opgroeien. Mediageweld is een bijkomende risicofactor voor adolescenten in gezinnen met veel conflict of met agressieve vrienden. Wel was het effect van mediageweld op agressie ook in deze kwetsbare groep nog steeds vrij klein. Voor docenten en hulpverleners die met zulke tieners en hun families werken, is het goed om te weten dat minder blootstelling aan gewelddadige games of televisieprogramma’s (zeker als dat in samenspraak met de tiener gebeurt) een kleine maar behulpzame stap in de juiste richting kan zijn.

Dit proefschrift draagt bij aan de wetenschappelijke literatuur en het publieke debat door te onderzoeken welke adolescenten agressiever worden door mediageweld, in plaats van aan te nemen dat zulke effecten aan- of afwezig zijn voor alle jongeren. Hoewel het debat over effecten van mediageweld suggereert dat effecten óf groot en belangrijk, óf klein en onbelangrijk zijn, concludeert dit proefschrift dat mediageweld een klein maar betekenisvol effect kan hebben op agressie onder jongeren. Adolescenten in een negatieve sociale context worden na verloop van tijd iets agressiever door het spelen van gewelddadige games of het kijken van gewelddadige televisieprogramma’s. Aan de andere kant lijken adolescenten in normale of positieve sociale omgevingen niet agressiever of juist iets minder agressief te worden van mediageweld. Dit laat zien dat er geen *one-size-fits-all* antwoord is op vragen over media-effecten. In plaats daarvan is het relevanter – theoretisch, empirisch en praktisch – te erkennen dat media een complexe rol speelt in het leven van jongeren. Door een andere, differentiële blik te werpen op de klassieke kwestie van mediageweld en agressie, levert dit proefschrift nieuwe inzichten en een stap naar een meer gebalanceerd inzicht in de effecten van mediageweld.

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WW – W. D. Weeda

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Chapter 2

Assessing the reliability and validity of television and game violence exposure measures

Fikkers, K. M., Piotrowski, J. T., & Valkenburg, P. M.

Author KF had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: KF, JP, and PV. Data acquisition: KF, JP, and PV. Data analysis and interpretation: KF and JP. Manuscript preparation: KF, JP, and PV. All authors read, edited and approved the final manuscript.

Chapter 3

Double dose: High family conflict enhances the effect of media violence exposure on adolescents' aggression

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Chapter 4

A matter of style? The differential effects of parental mediation on early adolescents' media violence exposure and aggression

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Chapter 5

The role of perceived peer norms in the relationship between media violence exposure and adolescents' aggression

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Chapter 6

Beyond the lab: Investigating early adolescents' cognitive, emotional, and arousal responses to violent games

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Author KF had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: KF, JP, and PV. Data acquisition: KF, JP, and PV. Data analysis and interpretation: KF and JP. Manuscript preparation: KF, JP, and PV. All authors read, edited, and approved the final manuscript.

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Karin



ABOUT THE AUTHOR

Karin Fickers (April 14, 1986) began her academic career as a bachelor student in Business Communication at the Radboud University Nijmegen. During her bachelor program (2004-2007), she also completed the two-year extracurricular and interdisciplinary Honours Programme. After receiving her bachelor's degree, Karin was admitted to the research master Language and Communication, a joint program at the Radboud University and the University of Tilburg. In 2010, she graduated *cum laude* from this program.

From 2011 to 2015, Karin was a PhD student at the Center for research on Children, Adolescents, and the Media (CcaM), which is part of the Amsterdam School of Communication Research (ASCoR) at the University of Amsterdam. During this time, she was a member of the project "The entertainization of childhood," funded by the European Research Council via an Advanced Grant to Professor Patti Valkenburg. Within this project, Karin's research focused on adolescents' social susceptibility to media violence, which resulted in this dissertation. During her time as a PhD student, Karin published her work in high-ranked communication journals such as *Communication Research* and *Media Psychology* and presented at several national and international conferences. In 2014, she spent two months as a visiting scholar at the Annenberg Public Policy Center and the Annenberg School for Communication at the University of Pennsylvania. Throughout her PhD, Karin has been an active member of the academic community and contributed to professional organizations such as the Netherlands-Flanders Communication Association, where she was co-chair of the Young Scholars Network (2012-2014), and the International Communication Association, where she serves as Secretary of the Children, Adolescents, and Media division (2014-2016).

Since September 2015, Karin works as a postdoctoral researcher at CcaM. In this new role, she continues to work on Patti Valkenburg's ERC-funded project while also contributing to the Consortium on Individual Development (CID), a consortium of researchers from several Dutch universities that is funded through NWO's Gravitation (Zwaartekracht) programme. Within these projects, she aims to achieve a deeper understanding of the role of (violent) media entertainment in children's lives.

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Does violence on television and in games make teens more aggressive? The answer is subject to passionate debates among parents, children, journalists, and academics. Some of them are convinced that youth become more aggressive after playing *Call of Duty* or watching *Game of Thrones*, and others are equally convinced that this is not the case. Rather than assuming that effects of media violence on aggression are the same for all teens, this dissertation investigated *which* adolescents may be more vulnerable to media violence. To that end, this dissertation asked how the social context of adolescents – their family, parents, and peers – influences the relationship between media violence and aggression. The dissertation reports the results of five empirical studies based on data from circa 500 Dutch families with children between 10 and 14 years old. By applying a different(ial) perspective to the classic question of media violence and aggression, this dissertation offers new insights and a step towards a more balanced understanding of media violence effects.