



Longitudinal effects of media violence on aggression and empathy among German adolescents

Barbara Krahé*, Ingrid Möller

University of Potsdam, Germany

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ABSTRACT

To address the longitudinal relation between adolescents' habitual usage of media violence and aggressive behavior and empathy, $N = 1237$ seventh and eighth grade high school students in Germany completed measures of violent and nonviolent media usage, aggression, and empathy twice in twelve months. Cross-lagged panel analyses showed significant pathways from T1 media violence usage to higher physical aggression and lower empathy at T2. The reverse paths from T1 aggression or empathy to T2 media violence usage were nonsignificant. The links were similar for boys and girls. No links were found between exposure to nonviolent media and aggression or between violent media and relational aggression. T1 physical aggression moderated the impact of media violence usage, with stronger effects of media violence usage among the low aggression group.

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Introduction

Despite the rapidly growing body of research addressing the potentially harmful effects of exposure to violent media, the evidence currently available is still limited in several ways. First, there is a shortage of longitudinal research examining the associations of media violence usage and aggression over time. Such evidence is crucial for examining hypotheses about the causal directions of observed co-variations of media violence usage and aggression that cannot be established on the basis of cross-sectional research. Second, most of the available longitudinal evidence has focused on aggression as the critical outcome variable, giving comparatively little attention to other potentially harmful effects, such as a decrease in empathy with others in distress. Third, the vast majority of studies available to date were conducted in North America. However, even in the age of globalization, patterns of media violence usage and their cultural contexts may vary considerably, calling for a wider database from different countries to examine the generalizability of results (e.g., Anderson et al., 2008; Möller & Krahé, 2009). This paper was designed to address each of these aspects. It presents findings from a longitudinal study with a large sample of early adolescents in Germany, relating habitual usage of violence in movies, TV series, and interactive video games to self-reports of physical aggression and empathy over a period of twelve months.

The study focused on early adolescence as a developmental period characterized by a confluence of risk factors as a result of biological, psychological, and social changes for a range of adverse outcomes. Regular media violence usage may significantly contribute to the overall risk of aggression as one such negative outcome. Media consumption increases from childhood to early adolescence (Kirsh, 2006), and adolescents find it easier to get access to a violent media diet because they spend more time away from home, reducing the opportunities for parental control. Although theories about media effects typically pay little attention to developmental changes, it is important to note that adolescence is characterized by heightened arousal and aggression in relation to hormonal changes on the one hand (Buchanan, Eccles, & Becker, 1992), and brain development associated with a dip in certain areas of cognitive functioning, such as perspective taking, on the other (Blakemore & Choudhury, 2006). Whereas heightened arousal may explain an increase in attraction to violent media stimuli (Kirsh, 2006), cognitive limitations should lower the threshold for aggression by narrowing information processing down to the most salient situational cues. Kirsh (2010, p. 231) concluded that "adolescence appears to be a time during which youths are particularly vulnerable to the effects of media" and he points out that the evidence in support of a link between media violence usage and aggression is more consistent for adolescence than for other periods of development.

Meta-analytic evidence has repeatedly demonstrated substantial effect sizes for the link between usage of violent media and the tendency to engage in aggression, across different methodologies (Anderson & Bushman, 2002), different media (Anderson, 2004; Paik & Comstock, 1994), different settings (Christensen & Wong, 2007), and different outcome variables at the cognitive, affective, and behavioral levels (Bushman & Huesmann, 2006). At the same time,

* Corresponding author. University of Potsdam, Department of Psychology, Karl-Liebknecht-Str. 24-25, D-14476 Potsdam, Germany. Tel.: +49 331 9772878; fax: +49 331 9772795.

E-mail address: krahe@uni-potsdam.de (B. Krahé).

critics have questioned the strength of the evidence for the aggression-enhancing effect of media violence usage, raising concern over both the methodology and the interpretation of research findings (e.g., Ferguson, 2007; Sherry, 2007). Thus, the debate on the media violence–aggression link is far from being resolved.

Theories explaining the pathway from media violence usage to aggression have focused on the role of violent media in instigating observational learning, promoting the development of aggressive scripts, and leading to emotional habituation to the pain and suffering of others. *Observational learning* refers to the acquisition of cognitive structures that promote specific behaviors from observing others perform those or similar behaviors. Watching media characters behave in a violent fashion can trigger a process of observational learning in which a new cognitive and behavioral repertoire is acquired. Bandura's (1977) social learning theory argues that imitation is most likely to occur if the models are attractive and if they are rewarded for their behavior. Both these conditions are true for many forms of media violence. Content analyses of media violence depictions have shown that aggression is often performed by attractive and likeable characters whose actions are presented as legitimized by a good cause and who are rewarded by positive outcomes (e.g., National Television Violence Study, 1997).

Habitual exposure to violent acts that are presented as successful and legitimate is seen by Huesmann (1998) as contributing to the development of aggressive scripts. Aggressive scripts consist of stored knowledge structures about how the person should behave in particular situations and what the likely outcome of those behaviors would be. Aggressive scripts are primed and retrieved when attributions about the current situation activate concepts connected to the script. Whether or not a script is utilized also depends on the passage of the script through a series of filters. The script must not seem incompatible with one's normative beliefs about what behaviors are appropriate, and thinking about the outcome of the script must also make one "feel good". The more often a script has been enacted with positive consequences for the actor, the more firmly it becomes engrained in the person's cognitive and behavioral repertoire and the more easily it is retrieved on subsequent occasions.

In addition to the positive association between media violence usage and aggression, there is evidence of a negative relation between media violence usage and empathic concern for others (Funk, 2005). According to the General Aggression Model (GAM) by Anderson and Bushman (2001), repeated confrontation with violence in the media reduces emotional responsiveness to the observation of violence through a process of habituation. Viewers get used to seeing others suffer and being killed in the virtual reality and may respond with less empathy to the plight of others in the real world. Funk, Baldacci, Pasold, and Baumgardner (2004) found a negative relationship between playing violent video games and empathy in a sample of elementary school children. Bartholow, Sestir, and Davis (2005) reported significant negative links between video game violence exposure and empathy as well as between empathy and aggression in their sample of male undergraduates. Thus, there is evidence to suggest that habitual exposure to media violence decreases the emotional sensitivity to the suffering of others, which is an essential requirement for recognizing the adverse effects of aggression on the victims and inhibiting aggressive behavior (Funk, 2005). To address this issue in a longitudinal analysis, the present study examined the hypothesis that higher media violence exposure would be related to lower empathy a year later.

Explaining the pathway from habitual media violence exposure to aggression through observational learning, script learning, and emotional habituation implies the assumption of a causal effect of media violence exposure on aggressive behavior. Whether there is a causal link and in what direction has been debated in the literature. Cross-sectional data showing positive correlations between media violence usage and aggression cannot establish causality nor can they

distinguish between two hypotheses about the directionality of the observed links. The so-called "socialization hypothesis" postulates that the portrayal of violence in the media serves to make users more aggressive over time through the processes described above (Anderson & Bushman, 2001; Huesmann, 1998). By contrast, the so-called "selection hypothesis" argues that individuals who are more aggressive to begin with seek out violent media contents because these contents reassure them that their own aggressive behavior is not uncommon and is presented as justified (Huesmann, Moise-Titus, Podolski, & Eron, 2003). Both causal pathways can, in principle, operate concurrently and/or reinforce each other over time, as reflected in the "downward spiral" model proposed by Slater, Henry, Swaim, and Anderson (2003).

To address the directionality of the link between media violence usage and aggression, longitudinal research is the method of choice, but the evidence is limited especially for the developmental period of adolescence. The meta-analytic review by Anderson and Bushman (2002), which included 42 samples, yielded a significant effect size of .17. In a large sample of early adolescents who were measured four times over a two-year period, Slater et al. (2003) found that use of violent media predicted increases in aggression at subsequent points in time, whereas aggressiveness was related to the preference for violent media only concurrently but not over time. Longitudinal studies from countries other than the US that focus on adolescents are even rarer but have also produced evidence that media violence exposure predicts aggression over time. Two studies from Japan reported by Anderson et al. (2008) with adolescents aged between 12 and 15 (Study 1) and between 13 and 18 (Study 2) yielded significant correlations of $r = .34$ and $r = .23$, respectively, between T1 violent video game usage and T2 aggression measured four months later. Three further recent studies contribute longitudinal data from Germany. Hopf, Huber, and Weiß (2008) followed a sample of 5th to 7th graders over a period of two years, showing that media violence exposure at T1 was a significant predictor of violent behavior at school two years later ($\beta = .19$). Using a broader measure of media violence usage encompassing different media, Lösel, Bliesener, and Bender (2007) showed that in their sample of 7th and 8th grade boys, media violence usage was significantly correlated with physical aggression in self-reports ($r = .40$) and teacher ratings ($r = .12$) obtained 20 months later. Finally, Möller and Krahé (2009) followed a sample of 7th and 8th graders over a period of 30 months. Path analyses showed that video game violence exposure at T1 predicted physical aggression 30 months later ($r = .27$), whereas aggression at T1 was unrelated to later video game use.

A further issue refers to the comparison of violent vs. nonviolent media usage. Christakis and Zimmerman (2008) found no link between nonviolent TV viewing during the preschool years and antisocial behavior five years later. Johnson, Cohen, Smailes, Kasen, and Brook (2002) reported significant associations between media usage in general and aggression, but they failed to differentiate between overall TV use and violent TV use. However, the interpretation of these findings is problematic because there is evidence that overall measures of media usage are highly correlated with violent media usage. Gentile, Lynch, Linder, and Walsh (2004) employed separate measures of overall amount of video game play and amount of violent game play to predict aggression-related outcome variables and found that violent video game play but not total amount of play predicted physical aggression. By contrast, Anderson, Gentile, and Buckley (2007; Study 2) reported significant correlations between their measure of total screen time and four measures of aggression. It should be noted, however, that the overall measures used in these studies included time spent using violent media and therefore do not represent clean measures of nonviolent media use (see also Krahé & Möller, 2004). Moreover, the theoretical underpinnings of the link between general media usage and aggression are weak, given that theoretical accounts of media violence effects on aggression, such as

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