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Aggression and Preference for First-Person Shooter and Action Games: Data From a Large-Scale Survey of German Gamers Aged 14 and Above

Johannes Breuer, Ruth Festl, & Thorsten Quandt

Cross-sectional studies on video game violence and aggression have yielded contradictory results. Parts of this inconclusiveness can be attributed to the limitation to particular age groups. The present study investigated the relationship between preference for action and first-person shooter (FPS) games and aggression for the groups of adolescents (14-18), younger (19-39), and older adults (40+) in a sample of German gamers (N = 4,500). The strength of the association differed between age groups. Even after controlling for gender, education, social support, self-efficacy, and overall video game use, we found a significant relationship between preference for action and FPS games and physical aggression that was strongest for the adolescents. We found no such association for anger and verbal aggression. The results indicate that potential selection or socialization effects are likely to differ with age and that research on video games and aggression can benefit from the inclusion of more heterogeneous samples.

Keywords: Adolescents; Aggression; Computer Games; Video Games

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From the onset of social science research on digital games in the 1980s until today, the relationship between their use and aggression has been the cause of substantial controversy both in the public and the academic discussion. Recent government reports from Sweden (Statens Mediaråd, 2011) and Australia (Australian Government Attorney-General's Department, 2010) reviewed the available research in this area and found it to be inconclusive. Likewise, the majority decision of the U.S. Supreme Court in the Brown v. EMA case (201 1) stated that the empirical evidence for the link between video game violence and aggression is not convincing. This ambiguity in the findings not only concerns experimental studies, but also cross-sectional research. A number of studies found evidence for a relationship between the use of violent video games (VVG) and aggression or aggression-related variables, such as aggressive behavior (Anderson & Dill, 2000; Anderson et al., 2004), delinquency (Anderson & Dill, 2000), physical aggression (Koglin, Witthöft, & Petermann, 2009), or normative beliefs about aggression and violence (Krahé & Möller, 2004). Other studies found no link between video game violence and youth violence (Ferguson, San Miguel, & Hartley, 2009), trait aggression (Ferguson et al., 2008), and deviant (Gunter & Daly, 2012) or aggressive (Ferguson, 2011) behavior.
Similar to the individual studies, meta-analyses that look at cross-sectional research on video games and aggression (Anderson & Bushman, 2001; Anderson, 2004; Anderson et al., 2010; Ferguson & Kilburn, 2009; Ferguson, 2007; Sherry, also yield different results, with effect sizes ranging from .26 (Anderson, 2004) to .08 (Ferguson & Kilburn, 2009). The meta-analysis by Ferguson and Kilburn (2009) identified several methodological shortcomings in the field, such as the use of invalid measures of aggression or the failure to control for important third variables. In a recent review of the literature on aggression and digital games, Elson and Ferguson (2014) also point out the importance of third variables.

Video Game Use, Aggression, and Age

Previous studies identified and controlled for a number of potentially influential third variables, including hostile attribution bias (e.g., Krahé & Möller, 2004), friendship quality (Willoughby, Adachi, & Good, 2011), socioeconomic status (e.g., Von Salisch, Vogelgesang, Kristen, & Oppl, 2011), self-efficacy (Hopf, Huber, & Weiß, 2008), or gender (e.g., Slater, Henry, Swaim, & Anderson, 2003).A variable that has been largely neglected in research on video games and aggression, however, is age. Almost all of the correlational studies are either limited to a particular age group (mostly children and adolescents) or rely on convenience samples. Older adults especially are rarely considered in studies on video games and aggression. Given that personality traits, media preferences, and their respective stabilities change over time, it may be that the link between (violent) video games and aggression also varies with age.
First of all, video game preferences differ between age groups (Greenberg, Sherry, Lachlan, Lucas, & Holmstrom, 2010). Genres that are fast paced and more likely to include violence, such as action and first-person shooter (FPS) games, are more popular among younger players (Quandt, Breuer, Festl, & Scharkow, 2013). On

the other hand, games that feature extreme depictions of violence are often rated M or 18+ and, thus, not legally available to minors. Accordingly, age not only influences the interest in certain games, but also their accessibility. Research on aggression has also shown a curvilinear relationship between aggression and age with peaks in early adolescence (Lindemann, Harakka, & Keltikangas-Järvinen, 1997; Loeber & Stouthamer-Loeber, 1998). In their longitudinal study of video game preferences and aggressive behavior among 8- to 12-year-old children, Von Salisch et al. (2011) note that the selection effect they found may be the beginning of a downward spiral, as suggested by Slater et al. (2003). The authors speculate that socialization effects may occur once media preferences have become more stable at a certain age. In a review of the literature on the effects of violent video games on adolescents, Kirsh (2003) argues that the role of development has been largely ignored but is likely to be an important factor. As some of the disparity in the results of cross-sectional studies might be due to differences between age groups, we wanted to know whether the link between video games and aggression differs by age. To answer this question we compared the relationship between preference for shooter and action games (both genres that have been shown to include substantial amounts of violence) and different types of aggression for adolescents (aged 14-18), younger (19-39), and older (40+) adults using data from a large-scale survey of German gamers aged 14 and above (N = 4,500).

Methods

Participants and Procedure

The recruiting procedure of the present study consisted of two steps. In a first step, a representative sample of 50,000 persons aged 14 and older were asked about their use of video games in an omnibus telephone survey. Approximately 25% (N= 12,587) of the respondents could be identified as gamers (i.e., individuals who play computer or video games at least occasionally). From this group we recruited a sample of 4,500 gamers and 500 nongamers for an extended computer-assisted telephone interview (CATI). The telephone interviews were conducted by a professional market research institute in Germany. As we were interested in the link between the use of violent video games and aggression, we only used data from the gamers for our analyses in the present article. A total of 41.6% of the participants in the gamer sample were female, and the age ranged from 14 to 89 years (M=37.73, SD=15.49). The average playing time per week was 6 hours (SD=9.49).

Measures

Since the telephone survey included questions on many different topics, and to minimize respondent burden, we employed abbreviated versions of established scales for most of the constructs that were measured. The items were chosen based on their factor loadings in the original studies or validation studies for the German translations of the scales, if these were available.

Aggression. We measured three types of aggression: physical aggression, anger, and verbal aggression. For each subdimension, we used two items from the German translation (Herzberg, 2003) of the Aggression Questionnaire by Buss and Perry (1992). Cronbach's alpha was .75 for physical, .57 for anger, and .60 for verbal aggression. The scale and its abbreviated version (Buss & Warren, 2000) have already been used in many studies on video game violence and aggression (Anderson & Dill, 2000; Anderson et al., 2004; Ferguson et al., 2008; Ferguson & Rueda, 2010; Koglin et al., 2009; Möller & Krahé, 2009; Puri & Pugliese, 2012).

Video game use. General video game use was measured in minutes per day. We assessed preferences for 11 primary genres: role-playing, strategy, simulation, platform, sports, racing, action, first-person shooter, adventure, music and party, and puzzle. Participants were asked to indicate how much they like playing these genres on a 5-point Likert scale ranging from 1 (not at all) to 5 (very much). As we were mainly interested in the relationship between violent video game content and aggression, we focused on the preference for action and first-person shooter games, as these genres are the most violent ones (Von Salisch et al., 2011). The mean of the scores for action and FPS was used for all analyses in this article.

Additional variables. In addition to the measures of aggression and video game use, we included several variables that have been previously identified as potentially relevant covariates in the relationship between these two: self-efficacy (Hopf et al., 2008; Von Salisch et al., 2011), social support (Hopf et al., 2008; Willoughby et al., 2011), education (Brady & Matthews, 2006; Ferguson et al., 2008; Von Salisch et al., 2011), and gender (Anderson et al., 2004; Ferguson et al., 2008; Slater et al., 2003; Von Salisch et al., 2011). Self-efficacy was measured using 5 items from the General Self-Efficacy Expectations Scale by Schwarzer and Jerusalem (1999; Cronbach's alpha = .70). Four items from the Berlin Social Support Scales (Schulz & Schwarzer, 2003) were used to measure social support (Cronbach's alpha = .84). For both scales, participants had to indicate to what degree the statements in the items apply to them on a 5-point Likert scale ranging from 1 (not at all)to5(completely). Education was assessed by asking participants about their highest educational degree. The categories reflected the German educational system and ranged from 0 (no school leaving certificate) to5 (university degree).

Data Analysis

To account for measurement errors, the main analysis was performed as a structural equation model with physical aggression, anger, and verbal aggression as endo-geneous and all others as exogeneous variables. All of the exogeneous variables and the residuals of the latent endogeneous variables were allowed to covary (see Tables 1 and 2). For the comparison of age groups, we distinguished between adolescents (aged 14 to 18), younger adults (19 to 39) and older adults (40+). The same grouping has been used in a previous publication by two of the authors of this article on video game addiction (Festl, Scharkow, & Quandt, 2013) and was kept to ensure a

Table 1 Correlations Between Latent Endogeneous Variables

	Adolescent (14-18) (N=512)			Younger adults (19-39) (N=1,803)			Older adults (40+) (N=1,952)		
	1	2	3	1	2	3	1	2	3
1. Physical aggression	–			–			–		
2. Anger	.59***	–		.35***	–		.22***	–	
3. Verbal aggression	.33***	.36***	–	.20***	.20***	–	.09	.18***	–

Note. Pearson correlation coefficients. Multiple-group structural equation model with metric invariance between groups (equal factor loadings). MLM estimation, Satorra-Bentler scaled x^2(df = 380) = 622.2, p < .001, CFI = .98, SRMR = .02, RMSEA = .03.
*p ≤ .05, **p ≤ .01, ***p ≤ .001.

comparability of the results. We estimated a multigroup model in which the factor loadings for the latent variables physical aggression, anger, verbal aggression, selfefficacy, and social support were constrained to be equal across groups to allow for comparisons of the regression coefficients. As the aggression variables were not normally distributed, we used the MLM estimator that is robust to nonnormality. The structural equation model was estimated using the lavaan package (Rosseel, 2012) for R. Missing data were excluded listwise, resulting in a sample of N = 4,267 for the final model. The descriptives for the participants that were included in the main analysis can be found in Table 3. The final model showed a very good fit: Satorra-Bentler scaled x^2 (Satorra-Bentler scale correction df= 380)= 622.2, p < .001, CFI= .98, SRMR= .02, RMSEA = .03.

Results

The preference for action and FPS games significantly predicted physical aggression, even after controlling for several potentially influential covariates (see Table 4). This association was strongest for the adolescent subgroup (β = .27, p < .001). The decrease with age can, in part, be attributed to the generally lower levels of physical aggression and preference for action and FPS in the older groups (see Table 3). Unlike the preference for action and shooter games, general video game use was not predictive of physical aggression in any of the age groups. Female gender and education emerged as additional significant predictors of physical aggression. This relationship, however, was negative, and the association with education also decreased with age (see Table 4). There was no significant association between self-efficacy or social support and physical aggression, with the exception of a small, but significant negative relationship
(β = -.10, p < .05) with social support in the oldest age group (40+).
Unlike physical aggression, the preference for FPS and action games was predictive of anger only in the adolescent group (see Table 5). However, this relationship was considerably smaller (B = .13, p ≤ .001) than the one with physical aggression (B = .21, p ≤ .001). Only female gender positively and significantly predicted anger

Table 2 Correlations Between Exogeneous Variables

	Adolescents (14-18) (2V= 512)						Younger adults (19-39) (N= 1803)						Older adults (40+) (N= 1952)					
	1.	2.	3.	4.	5.	6.	1.	2.	3.	4.	5.	6.	1.	2.	3.	4.	5.	6.
1. Preference for FPS & action	–						–				.		–					
2. Video game use	.40***	–					.23***	–					.11***	_				
3. Female gender	-.53***	-.29***	—				-.49***	-.15***	–				-.28***	-.02	–			
4. Education	-.07	-.12**	-.02	–			.00	-.13***	-.07**	–			-.05*	-.08**	-.05*	–		
5. Self-efficacy	.14*	.04	-.20***	-.02	—		.08**	.00	-.16*** .07*	.07*	–		.06*	-.03	-.09***	.09***	–	
6. Social support	-.18***	-.18***	.24***	.02	.28*** —	–	-.09***	-.07	.17*** .03	.03	.24***	–	-.14***	-.08*	.19***	.05	.22***	–

Note. Pearson correlation coefficients. Multiple-group structural equation model with metric invariance between groups (equal factor loadings). MLM estimation, Satorra-Bentler scaled x^2(df = 380) = 622.2, p < .001, CFI = .98, SRMR = .02, RMSEA = .03.

*p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table 3 Means and Confidence Intervals for Aggression and Gaming Variables

	Adolescents (14-18) (N=512)	Younger adults (19-39) (N= 1803)	Older adults (40+) (N=1952)
Given enough provocation, I may hit another	2.00 [1.90, 2.10]	1.48 [1.44, 1.52]	1.28 [1.25, 1.31]
There are people who pushed me so far that we came to blows.	1.89 [1.78, 2.00]	1.46 [1.42, 1.50]	1.17 [1.15, 1.20]
Mean physical aggression	1.95 [1.85, 2.04]	1.47 [1.43, 1.51]	1.23 [1.20, 1.25]
I have trouble controlling my temper.	2.13 [2.04, 2.23]	2.06 [2.01, 2.11]	2.17 [2.12, 2.22]
Sometimes I fly off the handle for no good reason.	3.00 [2.90, 3.10]	3.02 [2.96, 3.07]	2.87 [2.81, 2.93]
Mean anger	2.57 [2.49, 2.65]	2.54 [2.50, 2.58]	2.52 [2.48, 2.56]
I tell my friends openly when I disagree with them.	4.23 [4.15, 4.30]	4.18 [4.14, 4.22]	4.14 [4.10, 4.18]
When people annoy me, I may tell them what I Think of them.	3.66 [3.56, 3.75]	3.65 [3.60, 3.70]	3.51 [3.46, 3.55]
Mean verbal aggression.	3.94 [3.87, 4.01]	3.92 [3.88, 3.95]	3.82 [3.79, 3.86]
Gaming frequency (mins per day)	70 [62, 77]	57 [53, 61]	41 [37, 44]
Preference for action & FPS	2.92 [2.81, 3.02]	2.43 [2.37, 2.48]	1.60 [1.56, 1.64]

Note. Means and 95% CIs. All aggression items were scored on a 5-point Likert scale from 1 (does not apply at all) to 5 (applies completely).

Table 4 Regression Coefficients for Physical Aggression

	Physical aggression					
	Adolescents (14-18) (N = 512)		Younger adults (19-39) (N = 1803)		Older adults (40+) (N = 1952)	
	B	β	B	β	B	β
Preference for FPS & action	.21	.27***	.11	.19***	.06	.13***
Gaming frequency	.03	.05	.03	.06	.01	.04
Female gender	-.24	.12*	-.17	-.11***	-.12	-.15***
Education	-.20	-.23***	-.06	-.11***	-.03	-.11***
Self-efficacy	.16	.06	-.06	-.03	-.04	-.04
Social support	-.06	-.03	.00	.00	-.06	-.10**
R^2	.22		.09		.09	

Note. Unstandardized and standardized regression coefficients. Multiple-group structural equation model with metric invariance between groups (equal factor loadings). MLM estimation, Satorra-Bentler scaled
x^2(df= 380) = 622.2, p < .001, CFI = .98, SRMR = .02, RMSEA = .03.
*p ≤ .05, **p ≤ .01, ***p ≤ .001.

across all age groups, although this relationship decreased with age. Self-efficacy also negatively predicted anger, but this relationship was not significant in the youngest group. Neither preference for action and shooter games nor general video game use predicted verbal aggression in our sample (see Table 6). While the relationship between general use of digital games and verbal aggression was significant at the

Table 5 Regression Coefficients for Anger

	Anger					
	Adolescents (14-18) (N = 512)		Younger adults (19-39) (N = 1803)		Older adults (40+) (N = 1952)	
	B	β	B	β	B	β
Preference for FPS & action	.13	.24***	.01	.01	.02	.02
Gaming frequency	-.01	-.02	-.01	-.02	-.01	-.01
Female gender	.41	.29***	.22	.16***	.14	.10**
Education	.00	.00	-.04	-.08*	-.02	-.03
Self-efficacy	-.23	-.13	-.57	-.31***	-.59	-.36***
Social support	-.01	-.01	.04	.03	.03	.03
$_R2$	.09		.14		.14	

Note. Unstandardized and standardized regression coefficients. Multiple-group structural equation model with metric invariance between groups (equal factor loadings). MLM estimation, Satorra-Bentler scaled
x^2(df=380)=622.2, p<.001, CFI=.98, SRMR=.02, RMSEA=.03.
*p ≤ .05, **p ≤ .01, ***p ≤ .001.

Table 6 Regression Coefficients for Verbal Aggression

	Verbal aggression					
	Adolescents (14-18) (N = 512)		Younger adults (19-39) (N = 1803)		Older adults (40+) (N = 1952)	
	B	β	B	β	B	β
Preference for FPS & action	.05	.11	.03	.06	.02	.02
Gaming frequency	-.02	.06	.04	.09*	.02	.04
Female gender	.05	.04	.09	.07	-.08	-.06*
Education	.00	.01	-.07	-.15***	-.07	-.16***
Self-efficacy	.55	.39***	.66	.39***	.63	.41***
Social support	.22	.21**	.19	.16***	.14	.14***
$_R2$	.26		.23		.23	

Note. Unstandardized and standardized regression coefficients. Multiple-group structural equation model with metric invariance between groups (equal factor loadings). MLM estimation, Satorra-Bentler scaled

x^2(df= 380) = 622.2, p < .001, CFI = .98, SRMR = .02, RMSEA = .03.

*p ≤ .05, "p ≤ .01, ***p ≤ .001.

.05-level in the group of younger adults (19-39), the size of this association was rather small (b = .09). Unlike for physical aggression and anger, we found no notable gender differences for verbal aggression. There was a small, but significant negative relationship between education and verbal aggression in the two older groups. Interestingly, we found a medium-sized positive association between self-efficacy and verbal aggression across all age groups. Social support was also positively related to verbal aggression, although the effect size was generally smaller. This somewhat counterintuitive finding may be explained by the wording of the verbal aggression items (“I tell my friends openly when I disagree with them" and “When people annoy me, I may tell them what I think of them"). Given the rather positive meaning these items convey, individuals who read or hear these statements might interpret them as indicators of confidence, straightforwardness, or honesty.

Discussion

The present study was the first large-scale cross-sectional study on video game use and aggression that was able to compare this association between adolescents (aged 14 to 18), younger (19 to 39), and older adults (40+). In accordance with many of the previous correlational studies (e.g., Anderson, 2004; Anderson & Dill, 2000; Krahé & Möller, 2004) and most meta-analyses (Anderson, 2004; Anderson & Bushman, 2001; Anderson et al., 2010; Ferguson, 2007; Sherry, 2001), we found a small, but significant relationship between physical aggression and a preference for FPS and action games, even after controlling for a number of potentially relevant covariates. This association was strongest in the adolescent group. This group also showed the highest physical aggression scores, the strongest preference for the action and FPS

genres, and the most intense video game use in general. Although we controlled for several third variables, it might be that both preference for action and shooter games and aggression can be explained by another factor that was not measured in the present study, such as sensation seeking. A study by Steinberg et al. (2008) showed signs of a curvilinear relationship between age and sensation seeking with an increase between age 10 and 15, followed by a steady decline. Previous research has also linked sensation seeking with a preference for violent media content (Slater et al., 2003) and aggression (Joireman, Anderson, & Strathman, 2003).

That we found no association between a preference for action and FPS and verbal aggression warrants some further explanation, especially since this contradicts some of the previous findings in this area (Chory, & Cicchirillo, 2007). As the descriptives in Table 1 show, the agreement for the verbal aggression items was much higher than that for anger, which, in turn, was substantially higher than for physical aggression. It seems that verbal aggression, at least the way it was measured in this study, is a much more common and socially acceptable form of aggression. In addition, digital games most often depict physical aggression (Lachlan, Smith, & Tamborini, 2005; Smith, Lachlan, & Tamborini, 2003), although a content analysis by Ivory, Williams, Martins, & Consalvo (2009) also found frequent use of profanity in video games. Both socialization and selection effects are more likely to occur for types of violence that are similar.

The present study, however, was cross-sectional, so no claims can be made about causality. Another limitation of the current study is the use of abbreviated scales. This was due to the CATI method and might explain the relatively low alpha values for some of the scales. In addition, some factors that have been identified as important in other studies, such as family violence or delinquency (Ferguson, 2011; Ferguson et al., 2008, 2009; Ferguson, San Miguel, Garza, & Jerabeck, 2012), were not included due to the time constraints of the telephone interviews. The relatively low R^2s, especially for physical aggression in the older groups and anger in all age groups, suggest that there are additional predictors that have not been assessed in this study. Given the sensitive nature of some of these variables, however, they may not be suitable for telephone interviews. We also measured a preference for game genres and not actual exposure, and genres other than action and FPS often include some form of violence (Dietz, 1998; Haninger & Thompson, 2004; Smith et al., 2003), although the violence in FPS and action games typically is both more frequent and graphic. A more refined measure of exposure to violent video game would also distinguish between different types of violence (Tamborini, Weber, Bowman, Eden, & Skalski, 2013). At the same time, the violent content is not the only dimension on which action and FPS games differ from other genres. Adachi and Willoughby (2011) list the difficulty and pace of action of a game as additional variables that might be linked to aggression. Our findings might also be different for other countries, since Germany has a very strict regulation of violent media and many violent games are only available as low-violence versions.

Despite these limitations, however, we believe that our findings can add to the discussion about violent video games and aggression, as they have shown that a comparison between age groups that span more than a few years can provide

interesting insights. The use of more heterogeneous samples might be especially interesting for longitudinal designs, as this can help to assess whether there may be thresholds for both socialization and selection effects (Willoughby et al., 2011). The overall mixed evidence from longitudinal studies with some finding support for socialization effects (Hopf et al., 2008; Möller & Krahé, 2009; Wallenius & Punamäki, 2008; Willoughby et al., 2011), selection effects (Von Salisch et al., 2011), both (Slater et al., 2003) or none (Ferguson, Garza, Jerabeck, Ramos, & Galindo, 2013; Ferguson et al., 2012; Ferguson, 2011) might be disambiguated by comparisons between different populations. Looking at the differences between age groups in our study, it may well be that selection effects only occur at a certain age and then disappear or turn into socialization effects at later stages in life (as suggested by Von Salisch et al., 2011). Similar thresholds might also exist for other personological variables, such as trait aggression or personal experiences with violence.

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