

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

Breuer, Johannes; Festl, Ruth; Quandt, Thorsten

Postprint / Postprint

Zeitschriftenartikel / journal article

Zur Verfügung gestellt in Kooperation mit / provided in cooperation with:

GESIS - Leibniz-Institut für Sozialwissenschaften

### Empfohlene Zitierung / Suggested Citation:

Breuer, J., Festl, R., & Quandt, T. (2014). Aggression and Preference for First-Person Shooter and Action Games: Data From a Large-Scale Survey of German Gamers Aged 14 and Above. *Communication Research Reports*, 31(2), 183-196. <https://doi.org/10.1080/08824096.2014.907146>

### Nutzungsbedingungen:

Dieser Text wird unter einer Deposit-Lizenz (Keine Weiterverbreitung - keine Bearbeitung) zur Verfügung gestellt. Gewährt wird ein nicht exklusives, nicht übertragbares, persönliches und beschränktes Recht auf Nutzung dieses Dokuments. Dieses Dokument ist ausschließlich für den persönlichen, nicht-kommerziellen Gebrauch bestimmt. Auf sämtlichen Kopien dieses Dokuments müssen alle Urheberrechtshinweise und sonstigen Hinweise auf gesetzlichen Schutz beibehalten werden. Sie dürfen dieses Dokument nicht in irgendeiner Weise abändern, noch dürfen Sie dieses Dokument für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, aufführen, vertreiben oder anderweitig nutzen.

Mit der Verwendung dieses Dokuments erkennen Sie die Nutzungsbedingungen an.

**gesis**  
Leibniz-Institut  
für Sozialwissenschaften

### Terms of use:

This document is made available under Deposit Licence (No Redistribution - no modifications). We grant a non-exclusive, non-transferable, individual and limited right to using this document. This document is solely intended for your personal, non-commercial use. All of the copies of this documents must retain all copyright information and other information regarding legal protection. You are not allowed to alter this document in any way, to copy it for public or commercial purposes, to exhibit the document in public, to perform, distribute or otherwise use the document in public.

By using this particular document, you accept the above-stated conditions of use.

Mitglied der  
  
Leibniz-Gemeinschaft

## **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

---

Johannes Breuer (PhD, University of Cologne, 2013) is a research assistant in the Department of Communication at the University of Münster. Ruth Festl (MA, Ludwig Maximilian University of Munich, 2009) is a research assistant in the Department of Communication at the University of Hohenheim and the University of Münster. Thorsten Quandt (PhD, Ilmenau University of Technology, 2004) is a professor in the Department of Communication at the University of Münster. The authors would like to thank Michael Scharnow for comments on drafts of this article. Correspondence: Johannes Breuer, University of Münster, Department of Communication, Bispinghof 9-14, 48143 Münster, Germany; E-mail: [johannes.breuer@uni-muenster.de](mailto:johannes.breuer@uni-muenster.de)

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 (2011) 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) to 5 (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) to 5 (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 endogenous and all others as exogenous variables. All of the exogenous variables and the residuals of the latent endogenous 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)<br>(N=512) |        |   | Younger adults (19-39)<br>(N=1,803) |        |   | Older adults (40+)<br>(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  $\chi^2$ (df = 380) = 622.2,  $p < .001$ , CFI = .98, SRMR = .02, RMSEA = .03.

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

comparability of the results. We estimated a multigroup model in which the factor loadings for the latent variables physical aggression, anger, verbal aggression, self-efficacy, 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  $\chi^2$  (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 ( $\beta = .27$ ,  $p < .001$ ). 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

( $\beta = -.10$ ,  $p < .05$ ) 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 ( $B = .13$ ,  $p \leq .001$ ) than the one with physical aggression ( $B = .21$ ,  $p \leq .001$ ). 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* | –      |    | .06*                         | -.03   | -.09*** | .09*** | –      |    |
| 6. Social support                | -.18***                       | -.18*** | .24***  | .02  | .28*** | –  | -.09***                          | -.07    | .17***  | .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  $\chi^2(df = 380) = 622.2$ ,  $p < .001$ , CFI = .98, SRMR = .02, RMSEA = .03.

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

**Table 3** Means and Confidence Intervals for Aggression and Gaming Variables

|  | Adolescents (14-18)<br>(N=512) | Younger adults (19-39)<br>(N= 1803) | Older adults (40+)<br>(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<br>(14-18) (N = 512) |         | Younger adults<br>(19-39) (N = 1803) |         | Older adults<br>(40+) (N = 1952) |         |
|                             | B                                | $\beta$ | B                                    | $\beta$ | B                                | $\beta$ |
| 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 <sup>2</sup>              | .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

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

\* $p \leq .05, **p \leq .01, ***p \leq .001.$

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<br>(14-18) (N = 512) |         | Younger adults<br>(19-39) (N = 1803) |         | Older adults<br>(40+) (N = 1952) |         |
|                             | B                                | $\beta$ | B                                    | $\beta$ | B                                | $\beta$ |
| 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     |
| R <sup>2</sup>              | .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

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

\* $p \leq .05, **p \leq .01, ***p \leq .001.$

**Table 6** Regression Coefficients for Verbal Aggression

|                             | Verbal aggression                |         |                                      |         |                                  |         |
|-----------------------------|----------------------------------|---------|--------------------------------------|---------|----------------------------------|---------|
|                             | Adolescents<br>(14-18) (N = 512) |         | Younger adults<br>(19-39) (N = 1803) |         | Older adults<br>(40+) (N = 1952) |         |
|                             | B                                | $\beta$ | B                                    | $\beta$ | B                                | $\beta$ |
| 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***  |
| R <sup>2</sup>              | .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

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

\* $p \leq .05$ , \*\* $p \leq .01$ , \*\*\* $p \leq .001$ .

.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; Krahe & 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  $R^2$ s, 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 & Krahe, 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.

### **Funding**

The research leading to these results received funding from the European Union's Seventh Framework Programme (FP7=2007-2013) under grant agreement no. 240864 (SOFOGA).

### **References**

- Adachi, P. J. C., & Willoughby, T. (2011). The effect of violent video games on aggression: Is it more than just the violence? *Aggression and Violent Behavior, 16*, 55-62. doi:10.1016/j.avb.2010.12.002
- Anderson, C. A. (2004). An update on the effects of playing violent video games. *Journal of Adolescence, 27*, 113-122. doi:10.1016/j.adolescence.2003.10.009
- Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12*, 353-359. doi:10.1111/1467-9280.00366
- Anderson, C. A., Carnagey, N., Flanagan, M., Benjamin, A., Eubanks, J., & Valentine, J. (2004). Violent video games: Specific effects of violent content on aggressive thoughts and behavior. *Advances in Experimental Social Psychology, 36*, 199-249. doi:10.1016/S0065-2601(04)36004-1
- Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology, 78*, 772-790. doi:10.1037/0022-3514.78.4.772
- Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., ...Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries: A meta-analytic review. *Psychological Bulletin, 136*, 151-173. doi:10.1037/a0018251
- Australian Government Attorney-General's Department. (2010). . Barton, Australia. Retrieved from [http://www.classification.gov.au/Public/Resources/Pages/Other Resources/Literature review on the impact of playing violent video games on aggression.pdf](http://www.classification.gov.au/Public/Resources/Pages/Other%20Resources/Literature%20review%20on%20the%20impact%20of%20playing%20violent%20video%20games%20on%20aggression.pdf)
- Brady, S. S., & Matthews, K. A. (2006). Effects of media violence on health-related outcomes among young men. *Archives of Pediatrics & Adolescent Medicine, 160*, 341-347. doi:10.1001/archpedi.160.4.341

- Brown v. EMA, 564 U.S. (2011).
- Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology*, 63, 452-459. doi:10.1037/0022-3514.63.3.452
- Buss, A. H., & Warren, W. (2000). *Aggression Questionnaire manual*. Los Angeles, CA: Western Psychological Services.
- Chory, R. M., & Cicchirillo, V. (2007). The relationship between video game play and trait verbal aggressiveness: An application of the General Aggression Model. *Communication Research Reports*, 24, 113-119. doi:10.1080/08824090701304766
- Dietz, T. (1998). An examination of violence and gender role portrayals in video games: Implications for gender socialization and aggressive behavior. *Sex Roles*, 38, 425-442. doi:10.1023/A:1018709905920
- Elson, M., & Ferguson, C. J. (2014). Twenty-five years of research on violence in digital games and aggression: Empirical evidence, perspectives, and a debate gone astray. *European Psychologist*, 19, 47-55. doi:10.1027/1016-9040/a000164
- Ferguson, C. J. (2007). Evidence for publication bias in video game violence effects literature: A meta-analytic review. *Aggression and Violent Behavior*, 12, 470-482. doi:10.1016/j.avb.2007.01.001
- Ferguson, C. J. (2011). Video games and youth violence: A prospective analysis in adolescents. *Journal of Youth and Adolescence*, 40, 377-391. doi:10.1007/s10964-010-9610-x
- Ferguson, C. J., Garza, A., Jerabeck, J., Ramos, R., & Galindo, M. (2013). Not worth the fuss after all? Cross-sectional and prospective data on violent video game influences on aggression, visuospatial cognition and mathematics ability in a sample of youth. *Journal of Youth and Adolescence*, 42, 109-122. doi:10.1007/s10964-012-9803-6
- Ferguson, C. J., & Kilburn, J. (2009). The public health risks of media violence: A meta-analytic review. *The Journal of Pediatrics*, 154, 759-763. doi:10.1016/j.jpeds.2008.11.033
- Ferguson, C. J., & Rueda, S. M. (2010). The Hitman Study. *European Psychologist*, 15, 99-108. doi:10.1027/1016-9040/a000010
- Ferguson, C. J., Rueda, S. M., Cruz, A. M., Ferguson, D. E., Fritz, S., & Smith, S. M. (2008). Violent video games and aggression: Causal relationship or byproduct of family violence and intrinsic violence motivation? *Criminal Justice and Behavior*, 35, 311-332. doi:10.1177/0093854807311719
- Ferguson, C. J., San Miguel, C., Garza, A., & Jerabeck, J. M. (2012). A longitudinal test of video game violence influences on dating and aggression: A 3-year longitudinal study of adolescents. *Journal of Psychiatric Research*, 46, 141-146. doi:10.1016/j.jpsychires.2011.10.014
- Ferguson, C. J., San Miguel, C., & Hartley, R. D. (2009). A multivariate analysis of youth violence and aggression: the influence of family, peers, depression, and media violence. *The Journal of Pediatrics*, 155, 904-908.e3. doi:10.1016/j.jpeds.2009.06.021
- Festl, R., Scharnow, M., & Quandt, T. (2013). Problematic computer game use among adolescents, younger and older adults. *Addiction*, 108, 592-599. doi:10.1111/add.12016
- Greenberg, B. S., Sherry, J., Lachlan, K. A., Lucas, K., & Holmstrom, A. (2010). Orientations to video games among gender and age groups. *Simulation & Gaming*, 41, 238-259. doi:10.1177/1046878108319930
- Gunter, W. D., & Daly, K. (2012). Causal or spurious: Using propensity score matching to detangle the relationship between violent video games and violent behavior. *Computers in Human Behavior*, 28, 1348-1355. doi:10.1016/j.chb.2012.02.020
- Haninger, K., & Thompson, K. M. (2004). Content and ratings of teen-rated video games. *JAMA: The Journal of the American Medical Association*, 291, 402-410. doi:10.1001/archpedi.160.4.402
- Herzberg, P. (2003). Faktorstruktur, Gütekriterien und Konstruktvalidität der deutschen Übersetzung des Aggressionsfragebogens von Buss und Perry [Factor structure, quality criteria, and construct validity of the German translation of the Aggression Questionnaire by Buss and

- Perry]. *Zeitschrift für Differentielle und Diagnostische Psychologie*, 24, 311-323. doi:10.1024/0170-1789.24.4.311
- Hopf, W. H., Huber, G. L., & Weiß, R. H. (2008). Media violence and youth violence. *Journal of Media Psychology: Theories, Methods, and Applications*, 20(3), 79-96. doi:10.1027/1864-1105.20.3.79
- Ivory, J. D., Williams, D., Martins, N., & Consalvo, M. (2009). Good clean fun? A content analysis of profanity in video games and its prevalence across game systems and ratings. *Cyberpsychology & Behavior*, 12, 457-460. doi:10.1089/cpb.2008.0337
- Joireman, J., Anderson, J., & Strathman, A. (2003). The aggression paradox: Understanding links among aggression, sensation seeking, and the consideration of future consequences. *Journal of Personality and Social Psychology*, 84, 1287-1302. doi:10.1037/0022-3514.84.6.1287
- Kirsh, S. J. (2003). The effects of violent video games on adolescents. The overlooked influence of development. *Aggression and Violent Behavior*, 8, 377-389. doi:10.1016/S1359-1789(02)00056-3
- Koglin, U., Witthöft, J., & Petermann, F. (2009). Gewalthaltige Computerspiele und aggressives Verhalten im Jugendalter [Violent computer games and aggressive behavior in adolescence]. *Psychologische Rundschau*, 60(3), 163-172. doi:10.1026/0033-3042.60.3.163
- Krahé, B., & Möller, I. (2004). Playing violent electronic games, hostile attributional style, and aggression-related norms in German adolescents. *Journal of Adolescence*, 27, 53-69. doi:10.1016/j.adolescence.2003.10.006
- Lachlan, K. A., Smith, S. L., & Tamborini, R. (2005). Models for aggressive behavior: The attributes of violent characters in popular video games. *Communication Studies*, 56, 313-329. doi:10.1080/10510970500319377
- Lindeman, M., Harakka, T., & Keltikangas-Järvinen, L. (1997). Age and gender differences in adolescents' reactions to conflict situations: Aggression, prosociality, and withdrawal. *Journal of Youth and Adolescence*, 26, 339-351. doi:10.1007/s10964-005-0006-2
- Loeber, R., & Stouthamer-Loeber, M. (1998). Development of juvenile aggression and violence: Some common misconceptions and controversies. *American Psychologist*, 53, 242-259. doi:10.1037/0003-066X.53.2.242
- Möller, I., & Krahé, B. (2009). Exposure to violent video games and aggression in German adolescents: A longitudinal analysis. *Aggressive Behavior*, 34, 1-14. doi:10.1002/ab.20290
- Puri, K., & Pugliese, R. (2012). Sex, lies, and video games: Moral panics or uses and gratifications. *Bulletin of Science, Technology & Society*, 32, 345-352. doi:10.1177/0270467612463799
- Quandt, T., Breuer, J., Festl, R., & Scharkow, M. (2013). Digitale spiele: Stabile nutzung in einem dynamischen Markt. [Digital games: Stable patterns of use in a dynamic market]. *Media Perspektiven*, 10, 483-492.
- Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, 48(2), 1-36.
- Schulz, U., & Schwarzer, R. (2003). Soziale Unterstützung bei der Krankheitsbewältigung: Die Berliner Social Support Skalen (BSSS) [Social support in dealing with illness: The Berlin Social Support Scales (BSSS)]. *Diagnostica*, 49(2), 73-82. doi:10.1026/0012-1924.49.2.73
- Schwarzer, R., & Jerusalem, M. (1999). Skalen zur Erfassung von Lehrer- und Schülermerkmalen. Dokumentation der psychometrischen Verfahren im Rahmen der Wissenschaftlichen Begleitung des Modellversuchs Selbstwirksame Schulen [Scales for measuring the traits of teachers and students. Documentation of the psychometric procedures in the scientific evaluation of the project "Self-efficacy in schools"]. Berlin, Germany. Retrieved from <http://www.psyc.de/skalendoku.pdf>
- Sherry, J. (2001). The effects of violent video games on aggression. *Human Communication Research*, 27, 409-431. doi:10.1111/j.1468-2958.2001.tb00787.x
- Slater, M. D., Henry, K. L., Swaim, R. C., & Anderson, L. L. (2003). Violent media content and aggressiveness in adolescents: A downward spiral model. *Communication Research*, 30, 713-736. doi:10.1177/0093650203258281

- Smith, S. L., Lachlan, K. A., & Tamborini, R. (2003). Popular video games: Quantifying the presentation of violence and its context. *Journal of Broadcasting & Electronic Media*, 47, 58-76. doi:10.1207/s15506878jobem4701\_4
- Statens Medieråd. (2011). Våldsamma datorspel och aggression. En översikt av forskningen 2000-2011. [Violent computer games and aggression. An overview of the research 2000-2011]. Stockholm, Sweden. Retrieved from [http://www.statensmedierad.se/upload/\\_pdf/Statens\\_medierad\\_Valdsamma\\_datorspel\\_och\\_aggression.pdf](http://www.statensmedierad.se/upload/_pdf/Statens_medierad_Valdsamma_datorspel_och_aggression.pdf)
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology*, 44, 1764-1778. doi:10.1037/a0012955
- Tamborini, R., Weber, R., Bowman, N. D., Eden, A., & Skalski, P. (2013). "Violence is a many-splintered thing": The importance of realism, justification, and graphicness in understanding perceptions of and preferences for violent films and video games. *Projections*, 7, 100-118. doi:10.3167/proj.2013.070108
- Von Salisch, M., Vogelgesang, J., Kristen, A., & Oppl, C. (2011). Preference for violent electronic games and aggressive behavior among children: The beginning of the downward spiral? *Media Psychology*, 14, 233-258. doi:10.1080/15213269.2011.596468
- Wallenius, M., & Punamäki, R.-L. (2008). Digital game violence and direct aggression in adolescence: A longitudinal study of the roles of sex, age, and parent-child communication. *Journal of Applied Developmental Psychology*, 29, 286-294. doi:10.1016/j.appdev.2008.04.010
- Willoughby, T., Adachi, P. J. C., & Good, M. (2011). A longitudinal study of the association between violent video game play and aggression among adolescents. *Developmental Psychology*, 48, 1044-1057. doi:10.1037/a0026046