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INTERNATIONAL ARTICLE

# Hostility Among Adolescents in Switzerland? Multivariate Relations Between Excessive Media Use and Forms of Violence

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*Purpose:* **To determine what kind of violence-related behavior or opinion is directly related to excessive media use among adolescents in Switzerland.**

*Methods:* **A national representative sample of 4222 schoolchildren (7th- and 8th-graders; mean age 13.9 years) answered questions on the frequency of television-viewing, electronic game-playing, feeling unsafe at school, bullying others, hitting others, and fighting with others, as part of the Health Behaviour in School-Aged Children (HBSC) international collaborative study protocol. The Chi-square tests and multiple logistic regression analyses were applied to high-risk groups of adolescents.**

*Results:* **For the total sample, all bivariate relationships between television-viewing/electronic game-playing and each violence-related variable are significant. In the multivariate comparison, physical violence among boys ceases to be significant. For girls, only television-viewing is linked to indirect violence. Against the hypothesis, females' electronic game-playing only had a bearing on hitting others.**

*Conclusions:* **Experimental designs are needed that take into account gender, different forms of media, and violence to answer the question of whether excessive media use leads to violent behavior. With the exception of excessive electronic game-playing among girls, this study found that electronic media are not thought to lead directly to real-life violence but to hostility and indirect violence.** © ***Society for Adolescent Medicine, 2004***

KEY WORDS:
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Media use shapes our understanding and actions. In the mid-eighties, 65% of the participants of an American study agreed that their worldview was formed mainly through television [1]. Recently a number of reviews and a meta-analysis were carried out demonstrating the effects of electronic media use [2–7]. These effects comprise physical, verbal, and fantasy aggression, antisocial tendencies, rebelliousness, low frustration tolerance, delinquency, punishment, physiological arousal, cardiovascular responses, earlier onset of sexual activity, alcohol and tobacco use, and diet and nutrition choices, among others [8,9]. Nevertheless, quantitatively and qualitatively, these effects remain ambiguous [2,4,6]. Bensley and Van Eenwyk [2] concluded in their review: "Current research evidence is not supportive of a major concern that violent video games lead to real-life violence".

The term "real-life violence" seems to be very important in this context. There is no doubt that violent behavior can be socially learned from electronic media through role models and reinforcement [10], but whether this learned behavior is acted upon

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depends on a "double dose" [11], in the sense that the experience of media violence simply adds to existing exposure to family violence. The arousal theory [12] takes a similar line: Only an aggressive disposition or temporary anger is increased by violent video games.

Recently, a theory based on the social information-processing model [13] was developed to understand the effects of violent media use [14–16]. In this cognitive priming framework, excessive use of violent media changes our perception and interpretation of real-life events; ambiguous situations or behavior are more likely to be interpreted as aggressive. When the world is seen as a dangerous place, incoming information will be increasingly regarded as threatening, and individuals will react accordingly. Most video games depict a violent world in which attacking and destroying dangerous targets is normal behavior, and in which enemies, once killed, vanish from the screen [17].

According to the cognitive priming framework, one study showed that prolonged exposure to violent films led to hostile behavior in unprovoked participants and greater hostile behavior in provoked participants [16]. Kirsh [15] found that children playing violent video games interpret ambiguous situations more aggressively than children who play nonviolent video games. In the interpretation of the results, he suggested that playing violent video games leads to the development of a hostile attribution bias. Anderson and Dill [14] concluded from their studies that, in the short term, playing violent video games affects aggression by priming aggressive thoughts; in the long term, players learn and practice new aggression-related scripts that become more and more accessible for use when real-life conflict situations arise.

The present article endeavor to determine what kind of violence-related behavior or opinion is directly linked with media use. It is assumed that, on the bivariate level, an excessive use of electronic games as well as frequent television-viewing is related to an increased prevalence in all violence-related variables. Based on the theories and results presented above, it is further expected that, in the multivariate comparison, violence-related opinion, like feeling unsafe at school, and indirect violent behavior, such as bullying, should be more strongly linked to excessive media use than to physical aggression, like hitting or fighting. Because boys tend to play electronic games more frequently than do girls [3,14] and because violence has different implications for boys and for girls [18,19], separate analyses were conducted for each gender.

In addition, the present article focuses on high-risk groups based on the largest representative survey of adolescents in Switzerland. In an earlier work [9], the links among media use and several health risk behaviors were studied, based on linear relationships using structural modeling. As well as correlational or experimental studies, the present work focuses on groups of adolescents who show excessive characteristics of the variables under consideration. Villani [7] stresses that excessive use of media in particular increases high-risk behaviors. For example, Singer et al [20] found trauma symptoms and a high level of violent behavior only among those students who watched television for more than 6 hours a day.

## *Methods*

### Study Design

The data used for the analyses are part of the survey Health Behaviour in School-Aged Children (HBSC) [21], which is conducted every 4 years in 29 mostly European countries, under the supervision of the World Health Organization (WHO). By collecting information on a wide range of health indicators and factors that may influence them, the aim of the HBSC study is to promote a better understanding of health behaviors and lifestyles of young people across cultural contexts. For the fourth time, the Swiss Institute for Prevention of Alcohol and Drug Problems (SIPA) in 1998 conducted the Switzerland survey, which was funded by the cantons and the Swiss Federal Office of Public Health.

To achieve representativeness, a random cluster sampling procedure was used on a list of all classes of public schools (96.8% of all schools) compiled by the Swiss Federal Statistics Office. Classes served as sampling units, and an overall response rate of 88.1% was achieved. Data were collected on the basis of a written questionnaire, which was distributed during March 1998. The feasibility of the study and the quality of the questionnaire were ensured by means of a pilot-test study conducted in October 1997. To avoid systematic errors, the school boards were not told the date of distribution in advance. Teachers who administered the questionnaires in the classrooms were advised only to respond to adolescents' queries about the procedure and to guarantee the independent completion of the questionnaire without interference from classmates. The time frame for

filling out the questionnaires was one school lesson (about 45 minutes). According to the Institutional Review Board Guidelines [22], the pupils could freely choose to participate and confidentiality was ensured at all stages of the study. More details about the survey in 1998 in Switzerland can be found in Delgrande et al [23].

### Measures

The questionnaire was developed by an interdisciplinary research group from the participating countries. Subsequently, the resulting questionnaire was translated under supervision of the SIPA in the three main languages of Switzerland: German, French, and Italian. Details on the composition of the questionnaire can be found in Currie [24].

*Television-viewing.* The frequency of television-viewing was surveyed by: "How many hours a day do you usually watch TV?". The answer categories ranged from "not at all" (1) to "more than 4 hours" (6).

*Electronic game-playing.* Respondents were asked: "How many hours a week do you usually play computer games (e.g. on your television or your computer, Game Boy, Sega, etc.)?". The answer categories ranged from "not at all" (1) to "10 hours or more" (6).

*Feeling unsafe at school.* To ascertain whether students felt that the school environment was dangerous, we asked: "Do you feel safe at school?" The answer categories ranged from "always" (1) to "never" (5).

*Bullying others.* Because bullying is used in a specific way in social science, students were introduced to the topic by means of the Olweus definition [18]: "Here are some questions about bullying. We say a student is *being bullied* when another student, or a group of students, say or do nasty and unpleasant things to him or her. It is also bullying when a student is teased repeatedly in a way he or she doesn't like. But it is *not bullying* when two students of about the same strength quarrel or fight." From the offender's perspective, the question reads: "How often have you taken part in bullying other students in school this term?" The answer categories ranged from "I haven't bullied in school this term" (1) to "several times a week" (5).

*Hitting others.* Similar to the bullying question, the hitting of schoolmates was surveyed by: "Since the beginning of this year, 1998, did you hit another pupil?" The answer categories ranged from "not since the beginning of this year, 1998" (1) to "several times a week" (5).

*Fighting with others.* The question on fighting was taken from a large battery of questions asking for the 30-day prevalence of various violence-related events. Among other possibilities, the students had to indicate if they were involved in a fight.

### Statistical Analysis

In adolescence, electronic media use is an increasing phenomenon whereas violent behavior, especially hitting, is decreasing [25]. Therefore, the sample comprises only 7th- and 8th-graders (n = 4222), ensuring considerable prevalence in both domains. Approximately 10% of the sample with the highest values of the given variables was defined as a high-risk group. For most variables, the highest and the second highest values were recorded among this group. Because physical acts of violence are very unusual in Switzerland, the third highest value "sometimes" was also included to define a high-risk group for hitting others. The 1.3% to 2.5% of missing cases in the variables was excluded from the different analyses.

The sampling units were classes and not individuals. Therefore, Roberts et al [26] propose an overall design-effect of 1.2 for the 1998 HBSC and the sample used was down-weighted accordingly [27]. To examine if bivariate relations between the two types of media items and the types of violence-related variables exist, Chi-square tests were carried out. To determine what kind of violence shows a link with media use in the multivariate comparison, two-step logistic regression analyses were performed according to gender. Television-viewing and electronic game-playing were treated as separate dependent variables. First, to arrive at odds ratios as a basis for comparisons, bivariate relations were calculated separately for all violence-related variables. Second, multiple logistic regressions were performed, using all violence related variables simultaneously.

## *Results*

### Demographic Data

A description of the sample is shown in Table 1. No gender differences were found among grade, linguis-

**Table 1.** Description of the Unweighted Sample (Frequency, Percentage in Parentheses), Overall and by Gender and $\chi^2$ Tests of Gender Differences

| | Total | Boys | Girls | $\chi^2_{(df=1)}$ |
|---|---|---|---|---|
| **Total** | **4222 (100.0)** | **2079 (49.2)** | **2143 (50.8)** | — |
| 7th grade | 2126 (50.4) | 1067 (51.3) | 1059 (49.4) | 1.3 |
| German language | 3067 (72.6) | 1516 (72.9) | 1551 (72.4) | 0.1 |
| Swiss nationality | 3306 (78.3) | 1619 (77.9) | 1687 (78.7) | 0.4 |
| Television-viewing | 651 (15.7) | 348 (17.0) | 303 (14.4) | 4.9* |
| Electronic game-playing | 352 (8.4) | 280 (13.7) | 72 (3.4) | 118.0*** |
| Feeling unsafe | 378 (9.1) | 184 (9.0) | 194 (9.2) | 0.1 |
| Bullying others | 198 (4.8) | 135 (6.6) | 63 (3.0) | 24.2*** |
| Hitting others | 185 (4.4) | 142 (6.9) | 43 (2.0) | 48.8*** |
| Fighting with others | 378 (9.2) | 304 (15.0) | 74 (3.5) | 134.7*** |

$\chi^2$ tests performed on the down-weighted sample; * $p < .05$; *** $p < .001$.

tic region, and nationality. Although boys watch only slightly more television than girls, the gender differences for electronic game-playing are greater. Boys play over four times more frequently than do girls, and they are four times more often involved in a fight. They tend to be greater perpetrators of physical and indirect violence. However, there are no gender differences in relation to feeling unsafe at school.

In Table 2, the violence-related variables are displayed according to media use. For the overall sample, excessive television-viewing, as well as frequent electronic game-playing, is linear to a higher percentage of all observed forms of violence on the bivariate level. Divided by gender, differences in fighting with others are only significant for girls. For girls, on the other hand, electronic game-playing has no bearing on feeling unsafe at school, but is linked to bullying others.

### Logistic Regression Analyses

The first step in Table 3 shows a similar picture to Table 2. All odds ratios are significant on the bivariate level except fighting with others for boys, and indirect violence (bullying) and violence-related opinion (feeling not safe at school) in the case of excessive electronic game-playing among girls. The multivariate comparison (Step 2) for boys hitting others and fighting with others fails to reach significance. For girls, this only holds true for television-viewing. In the female group, only hitting others shows a relation to excessive game-playing. The explained variance is from 1% to 4%.

## *Discussion*

The concept of the present article arose from the idea that excessive media use is likely to change the perception and interpretation of real-life events rather than influence physical violence directly. This framework was applied to a large representative survey among adolescents in Switzerland. The hypothesis was that, in a multivariate comparison, violence-related opinion and indirect violent behavior should be more strongly linked with excessive

**Table 2.** Percentage of Violence Related Variables by the Extent of Media Use and Assessment of the Bivariate Relations Using $\chi^2$ tests

| | Television-viewing | | | Electronic Game-playing | | |
|---|---|---|---|---|---|---|
| | Low | High | $\chi^2_{(df=1)}$ | Low | High | $\chi^2_{(df=1)}$ |
| Overall | | | | | | |
| Feeling unsafe | 8.1 | 14.7 | 23.2*** | 8.7 | 13.7 | 8.0** |
| Bullying others | 3.9 | 10.1 | 38.1*** | 4.4 | 9.2 | 14.0*** |
| Hitting others | 3.7 | 8.0 | 20.1*** | 3.9 | 9.6 | 20.1*** |
| Fighting with others | 8.6 | 11.9 | 5.8* | 8.6 | 14.7 | 12.3*** |
| Boys | | | | | | |
| Feeling unsafe | 8.1 | 13.3 | 8.1** | 8.4 | 13.4 | 6.2* |
| Bullying others | 5.6 | 12.2 | 16.6*** | 6.0 | 10.7 | 7.3** |
| Hitting others | 6.1 | 10.8 | 8.1** | 6.5 | 9.9 | 3.7 |
| Fighting with others | 14.6 | 16.3 | 0.5 | 14.7 | 16.3 | 0.4 |
| Girls | | | | | | |
| Feeling unsafe | 8.2 | 15.9 | 14.6*** | 9.1 | 15.0 | 2.4 |
| Bullying others | 2.2 | 7.6 | 21.5*** | 3.0 | 4.9 | 0.8 |
| Hitting others | 1.5 | 5.2 | 15.3*** | 1.8 | 8.3 | 12.7*** |
| Fighting with others | 3.0 | 6.9 | 9.4*** | 3.2 | 10.0 | 7.9** |

* $p < .05$; ** $p < .01$; *** $p < .001$.

**Table 3.** Bivariate (Step 1) and Multivariate (Step 2) Relations Between Violence-related Variables and Excessive Media Use by Gender

| | Television-viewing | | Electronic Game-playing | |
|---|---|---|---|---|
| | OR | (95% CI) | OR | (95% CI) |
| **Boys** | | | | |
| Step 1 | | | | |
| Bivariate | | | | |
| Feeling unsafe | 1.77** | (1.19–2.61) | 1.69* | (1.11–2.59) |
| Bullying others | 2.36*** | (1.55–3.60) | 1.90** | (1.19–3.04) |
| Hitting others | 1.85** | (1.20–2.85) | 1.61* | (1.00–2.59) |
| Fighting with others | 1.13 | (0.80–1.60) | 1.12 | (0.76–1.63) |
| Step 2 | | | | |
| Multivariate | | | | |
| Feeling unsafe | 1.60* | (1.06–2.40) | 1.60* | (1.03–2.47) |
| Bullying others | 2.17*** | (1.39–3.38) | 1.74* | (1.07–2.85) |
| Hitting others | 1.47 | (0.91–2.35) | 1.31 | (0.78–2.20) |
| Fighting with others | 0.93 | (0.64–1.34) | 0.94 | (0.62–1.40) |
| $R^2_{(Nagelkerke)}$ | .02 | | .01 | |
| **Girls** | | | | |
| Step 1 | | | | |
| Bivariate | | | | |
| Feeling unsafe | 2.12*** | (1.44–3.13) | 1.80 | (0.87–3.71) |
| Bullying others | 3.63*** | (2.04–6.48) | 1.42 | (0.39–5.19) |
| Hitting others | 3.47*** | (1.72–7.03) | 5.02** | (1.88–13.43) |
| Fighting with others | 2.35** | (1.31–4.20) | 3.20* | (1.31–7.84) |
| Step 2 | | | | |
| Multivariate | | | | |
| Feeling unsafe | 1.96** | (1.30–2.94) | 1.65 | (0.78–3.46) |
| Bullying others | 2.75** | (1.47–5.16) | 0.59 | (0.13–2.64) |
| Hitting others | 1.93 | (0.85–4.38) | 3.95* | (1.24–12.55) |
| Fighting with others | 1.67 | (0.87–3.20) | 2.26 | (0.83–6.20) |
| $R^2_{(Nagelkerke)}$ | .04 | | .03 | |

* $p < .05$; ** $p < .01$; *** $p < .001$. CI = confidence interval; OR = odds ratio.

media use than physical violence, such as hitting and fighting. The results of the multivariate logistic regressions demonstrate that this applies to boys in general, and only to girls for television-viewing. Therefore, the results can be seen as supportive of the cognitive priming framework [15,16] described above. It seems that excessive television-viewing, in general, and electronic game-playing for boys foster the idea that the world, in our case the schoolyard, is a dangerous place, as portrayed in most video games [17]. This opinion bias seems to lead to indirect violence, such as bullying, rather than to physical violence.

This is not the case for those girls who excessively play electronic games. Here, only hitting others, not indirect violence, is significant. At first glance, this result could be caused by an outlier effect. Girls tend to play electronic games less frequently than boys [3,14,28]. Accordingly, in our sample only 72 (3.4%) girls play electronic games excessively, and thus the relation to hitting others in the total female sample can only occur in a small group of physically violent girls. Furthermore, in most cases, girls tend to be less familiar with physical violence on the one hand [18,19], and with electronic games and depictions of violence, on the other [14]. This may explain a more combative reaction and increased physical violence, rather than increased hostility and a tendency to bully others in the context of excessively playing electronic games.

Such gender differences are very rare in literature. One of the most recent reviews states that only one study found gender differences in the links between violent video games and subsequent aggression [2]. Based on this study among adolescents in Switzerland, gender differences on our study depend largely on the kind of aggression under examination. Because the studies cited in the reviews come mainly from North America, studies from the rest of the world are needed to decide if the gender differences found are the result of the methodology of the present article, special conditions in mainland Europe, or if these differences can be confirmed by evidence from other regions.

Comparing the two kind of electronic media, Sherry [6] stated that the effect of playing video games on aggression is smaller than that of exposure to television violence, whereas Dill and Dill [3] and Anderson and Dill [14] argue that violent video games have a greater impact than other forms of media violence. Apart from the question of quantity, the results of this study indicate that only television-viewing seems to have a more universal effect. In a previous study, based on linear structural modeling, there were higher correlations in the link to adolescent problem behaviors, such as unhealthy diet or substance use, for television-viewing compared with electronic game-playing [9]. Unfortunately, gender differences were not taken into account.

Frequent television-viewing is very common in all developed countries, but by contrast it is rare among adolescents in Switzerland. Of all 29 participating countries in the HBSC survey in 1998, Switzerland and France have the lowest percentage of adolescents who reported to watch television four hours or more a day [28]. The picture is different for electronic game-playing. Approximately 10% of girls and 30% of boys play four hours or more a week, placing Switzerland above the average.

### Limitations

The international collaborative HBSC study was designed to monitor a large variety of adolescent health and lifestyle behaviors [21]. For that reason, the different research areas could not be examined in depth. Only a small number of questions had to suffice to record a certain topic. Therefore, the frequencies of television-viewing and electronic game-playing are the only two questions available for the analysis of electronic media use. There is no information about the content of the films watched or the games played, but it can be assumed that most of them will involve violence. Since the 1980s, the portrayal of violence in films has increased [5]. Not only are most electronic games violent in nature [3,4,14], but also adolescents tend to prefer violent video games [3,29]. The frequency of use, however, seems to be important. Independent of the content, a link among the frequency of media use and different violence related variables could be found at the bivariate level.

In the present analyses the use of different media was treated as dependent variables. Owing to the cross-sectional nature of the data, it is not possible to determine if violent media use leads to a certain form of violence or if the opposite is the case. Normally, the results are interpreted in the way that media use shapes our understanding and actions. However, a study has shown that young offenders actually tend to prefer violent films [30]. Reviewing several studies, Cantor [31] concludes that, "the relationship between viewing violence and viewers' hostility is bidirectional."

Another point concerns the amount of explained variance across the dependent variables (between 1% and 4%). This proportion is not high but its importance should not be underestimated. Hughes and Hasbrouck [5] reviewed numerous studies and consistently found that the proportion of explained variance in the relationship between violence and media use was low. This can be related to the fact that other important factors are also associated with an excessive use of electronic media, such as parenting styles, substance use, or unhealthy diet [9].

## *Conclusions*

Experimental designs are needed that take into account gender, different forms of media, and violence to answer the question whether excessive media use leads to violent behavior. Only among those girls who excessively play electronic games can it be concluded from the results that electronic media use is directly associated with real-life violence. In general, only a small number of adolescents with excessive media use will manifest physical violence owing to a complex configuration of different risk factors. On the other hand, the results of the present study suggest that something is learned from television, making the schoolyard appear a dangerous place, in most cases as a consequence of bullying and not physical aggression.

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