

## Abstract

**OBJECTIVES:** A four year longitudinal study was designed to examine how media use (especially TV and video game use) of children affects their leisure time activities, social behavior, development of intelligence and school performance. Additionally, expedient concepts of media education for children, parents and teachers, are developed in cooperation with the participating schools, and systematically evaluated. **DESIGN:** Control group design (baseline, n = 113; treatment, n = 492; control, n = 454). **PARTICIPANTS:** 1.059 German elementary school children (followed from third- to fifth-grade). **MAIN OUTCOME MEASURES:** Media availability and exposure, leisure time and social behavior, perceived parental education and guidance (general/media), as well as socio demographic parameters; Students' IQ, academic self-image, classroom climate and social integration; Student's BMI; Parents' socio demographic parameters, educational achievement, media equipment and exposure (self/child) and their children's leisure time behavior. **RESULTS:** Partial correlational analyses (controlling for socio-economic status and students' IQ) showed significant relations between poor school performance and a high degree of in-home media availability and daily media exposure. Bedroom media ownership and a high degree of daily television exposure were also associated with a higher body mass index. These results were confirmed in terms of school achievement longitudinally by a structural equation analysis, which also demonstrated a significant gender difference in media ownership and exposure in favor of the boys, as well as the importance of parental guidance. First analyses showed effects of the intervention program regarding media exposure, media equipment, and school performance.

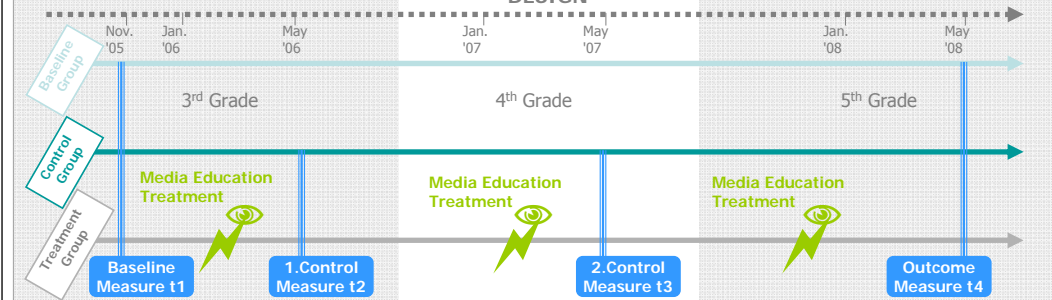
## Introduction

The variety of electronic media formats and their contents are of pivotal importance in the everyday life of children and adolescents. German nine-year-old school children, for example, spend an average of 1.5 hours daily watching television, and an average of 0.5 hours playing video and computer games; 13.9 % spend more than 3 hours daily adding up both activities (KIM 2003; KFN Schools Survey 2005). The possible effects of these often excessive media habits are still controversially discussed among researchers as well as in public opinion. Apart from the omnipresent debate regarding the relationship of violent media content and violent behavior, the possible influence of media use on children's and adolescent's school achievement is at the top of the agenda. The present study was designed to address these issues. For American third- and fourth-grade students Robinson et al. (2001) could demonstrate in a similar controlled school-based trial, that an intervention program aimed at reducing media use not only significantly decreased children's time watching television and playing video games, but also reduced their aggressive behavior, and improved overall class climate.

## Method

On all measurement occasions a paper-pencil interview is conducted within the class room setting concerning media availability and exposure, leisure time and social behavior, perceived parental education and guidance (general/media), as well as socio demographic parameters. Standardized psychological tests serve to assess students IQ (CFT 20), academic self-image, classroom climate and social integration (FEES 3-4; Questionnaire for ascertaining emotional and social school experiences of third- and fourth-grade elementary school children). Additionally, all students' body weight and height is taken. The children's parents are questioned at the first and the third measurement occasion regarding socio demographic parameters, educational achievement, media equipment and exposure (self/child) as well as their children's leisure time behavior. A teacher questionnaire is used to evaluate class characteristics, school performance and work habits at all measurement occasions. Starting in February 2006, media education was conducted in the intervention classes (n = 20).

### DESIGN



# Media Use and School Achievement – A German Longitudinal Study

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## Results

When controlling for socio-economic status and students' IQ significant cross-sectional as well as longitudinal relations between poor school performance and a high degree of bedroom TV-ownership as well as daily media exposure could be observed. These media measures were also associated with a higher body mass index at all measurement occasions (See table 1).

A Structural equation analysis showed that media exposure at t1 can serve to explain lower school achievement at t3, when controlled for socio-economic status, parents' education, migration background and students' IQ. A significant gender difference in media ownership, media exposure and use of violent media in favor of the boys, as well as the importance of parental guidance in media usage could be observed (See figure 1).

First analyses on the effectiveness of the intervention program showed reduced bedroom media ownership and media exposure for children in the 20 intervention schools, compared to children in the control schools. Regarding school achievement, a higher percentage of children improving their grades in the intervention group could be found (See table 2).

**Table 1.** Partial Correlational associations between media measures and school achievement respectively body mass index

	SchA <sub>t1</sub>	SchA <sub>t2</sub>	SchA <sub>t3</sub>	BMI <sub>t1</sub>	BMI <sub>t2</sub>	BMI <sub>t3</sub>
TV <sub>t1</sub>	-.12 <sup>**</sup>	-.15 <sup>*</sup>	-.17 <sup>*</sup>	.23 <sup>***</sup>	.24 <sup>***</sup>	.25 <sup>***</sup>
TWVD <sub>t1</sub>	-.16 <sup>**</sup>	-.10	-.13 <sup>*</sup>	.19 <sup>***</sup>	.19 <sup>***</sup>	.22 <sup>***</sup>
TWVE <sub>t1</sub>	-.17 <sup>*</sup>	-.20 <sup>**</sup>	-.19 <sup>**</sup>	.22 <sup>***</sup>	.21 <sup>***</sup>	.22 <sup>***</sup>

Note. TV<sub>t</sub>, bedroom TV-ownership; TWVD<sub>t</sub>, average daily time spent on TV on weekdays (parents' questionnaire); TWVE<sub>t</sub>, average daily time spent on TV on weekends (parents' questionnaire); SchA standardized mean grades in Math, German and Social Studies ( $m_{class} = 0$ ); BMI body mass index.

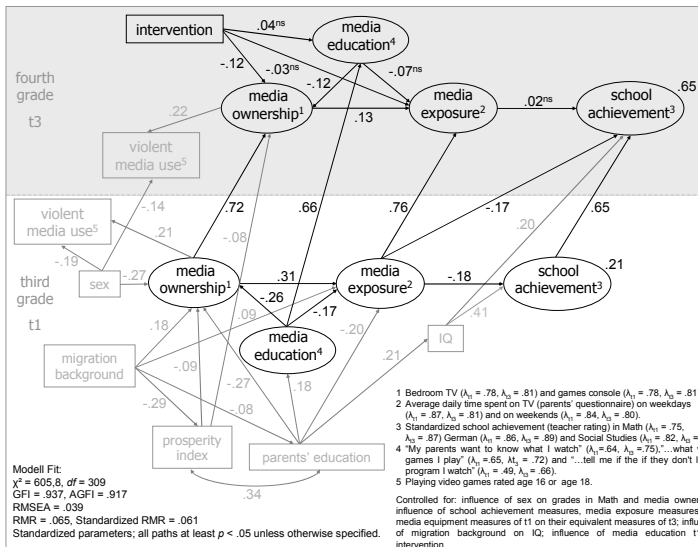
\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ ,  $\dagger p < .10$

**Table 2.** Media Equipment (in percent), media exposure on an average school day (in minutes) and improvement in school achievement (in percent) by group

	ME <sub>t1</sub> TV/GC	ME <sub>t3</sub> TV/GC	MT <sub>t1</sub> TV/VG	MT <sub>t3</sub> TV/VG	Imp <sub>t12</sub>	Imp <sub>t13</sub>
TG	41/30 <sup>1</sup>	41/34 <sup>1</sup>	56/22 <sup>2</sup>	78/36 <sup>2</sup>	51	56
CG	47/39 <sup>1</sup>	56/49 <sup>1</sup>	46/28 <sup>2</sup>	89/54 <sup>2</sup>	53	48

Note. TG treatment Group; CG Control Group; ME Bedroom Media Equipment (TV/Games Console); MT Media Exposure (TV/Video Games); Improvement in School Achievement (Yes/No).

- Multivariate (TV/GC) Analysis: Media Exposure (Repeated) \* Group,  $F(4/589) = 2.03$ ,  $p = .09$ ,  $\epsilon = .12$ ; Group,  $p < .01$ ,  $\epsilon = .14$ ; Media Exposure,  $p < .001$ ,  $\epsilon = .23$ .
- Multivariate (TV/GC) Analysis: Media Exposure (Repeated) \* Group,  $F(4/704) = 2.21$ ,  $p = .06$ ,  $\epsilon = .11$ ; Group,  $p < .01$ ,  $\epsilon = .14$ ; Media Exposure,  $p < .001$ ,  $\epsilon = .41$ .



Model Fit:  
 $\chi^2 = 605.8$ ,  $df = 309$   
 $GFI = .937$ ,  $AGFI = .917$   
 $RMSEA = .039$   
 $RMR = .065$ , Standardized RMR = .061  
 Standardized parameters: all paths at least  $p < .05$  unless otherwise specified.

Figure 1. Structural equation analysis of school achievement

## Conclusion

Taken together, these findings show the potential benefits of reducing the time spend on playing video games and watching television on school achievement. Indications for a causal relationship between media exposure and school achievement are observed in the longitudinal data.

### Further analyses

First of all, the question of what exactly affects achievement will be addressed. Further, going beyond school achievement, the impact of different (especially violent) media content on behavioral variables, such as empathy, helping or aggressive behavior will be examined.

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