Internet Use and Verbal Aggression: The Moderating Role of Parents and Peers

Markus Appel [a], Barbara Stiglbauer [b], Bernad Batinic [b] & Peter Holtz [c]

[a] University of Koblenz-Landau, Germany

[b] Johannes Kepler University of Linz, Austria

[c] Jacobs University Bremen, Germany

Accepted for publication in the journal *Computers in Human Behavior*

Corresponding author:
Markus Appel
Department of Psychology
University of Koblenz-Landau
Fortstr. 7, 76829, Germany
Email: appelm@uni-landau.de
Phone: ++49-6341-280-36714, Fax: ++49-6341-280-33401

Abstract

This research investigated the influence of parent-adolescent communication quality, as perceived by the adolescents, on the relationship between adolescents' Internet use and verbal aggression. Adolescents (N = 363, age range 10-16, M_{T1} = 12.84, SD = 1.93) were examined twice with a six-month delay. Controlling for social support in general terms, moderated regression analyses showed that Internet-related communication quality with parents determined whether Internet use is associated with an increase or a decrease in adolescents' verbal aggression scores over time. A three way interaction indicated that high Internet-related communication quality with peers can have disadvantageous effects if the communication quality with parents is low. Implications on resources and risk factors related to the effects of Internet use are discussed.

Keywords: Internet use, verbal aggression, parental mediation, communication quality, peers, longitudinal design

Internet Use and Verbal Aggression: The Moderating Role of Parents and Peers

1. Introduction

In recent years the Internet has become a significant part of many adolescents' lives (Rideout, Foehr, & Roberts, 2010). The increasing popularity of the Internet (due to more widespread broadband access and new applications such as Youtube and Facebook) has fuelled questions on its consequences by the general public and researchers alike. One field of inquiry is the role of parents and how they can contribute to more positive and less negative consequences of adolescent Internet use. The present research is focused on adolescents' Internet-related communication quality with their parents and their peers. Based on a longitudinal design, we examine the influence of parent-adolescent and peer-adolescent communication quality (as perceived by the adolescents) on the relationship between the amount of Internet use and adolescents' verbal aggression.

1.1 Internet Risks and Opportunities

The Internet offers plenty of activities for adolescents such as different forms of online communication and online video game play. With respect to online communication, there are three characteristics that differ from face-to-face communication: anonymity, asynchronicity, and accessibility (Valkenburg & Peter, 2011). Anonymity refers to a lack of audiovisual information such as nonverbal or paraverbal cues or the lack of any information regarding the (true) source of a comment or a chat message. Asynchronous communication is common on the Internet: Unlike face-to-face situations, many Internet applications

provide time to reflect about one's communication. This is apparent for forum posts and e-mail, but even chat software includes a send button that allows for prior deliberation. Moreover, the Internet provides access to plenty of written and audiovisual content and to a large number of communication partners who may or may not have similar interests, social background, or age.

These features of Internet communication can provide opportunities for adolescent development, but they involve risks. On the positive side, anonymity, asynchronicity, and accessibility can lead to an enhanced control of self-presentation and self-disclosure, and can make a positive contribution to adolescents' development (Valkenberg, Peter, & Schouten, 2006). For example, adolescents can communicate without apprehension about their physical appearance, which is often discomforting and can play a role in the development and perpetuation of psychological disorders such as eating disorders (cf. Fox, Rumsey, & Morris, 2007; Slater & Tiggemann, 2010). With more time for deliberation, adolescents can fine-tune their self-related utterances, and the Internet supplies ample opportunities to intensify pre-existing offline relationships (Reich, Subrahmanyam, & Espinoza, 2012) and to form friendships with others they might never have met or never have gotten closer to in the offline world.

On the other hand, anonymity, asynchronicity, and accessibility implicate specific risks for a healthy adolescent development. The arguably most obvious danger is the easy access to sexual and/or violent content, such as pornography, violent movies, or violent video games (e.g., Baumgartner, Valkenburg, & Peter, 2010; Gentile, Saleem, & Anderson, 2007). Moreover, since the early days of the Internet, it has been feared that communication on the Internet might be more hostile and offensive than face-to-face communication (e.g.,

Kiesler, Siegel, & McGuire, 1984). Social Identity Deindividuation Theory posits that an individual's online communication is strongly influenced by salient group norms (Postmes & Spears, 1998; Reicher, Spears, & Postmes, 1995). Thus, depending on these norms, communication may or may not be vulgar, hostile, or offensive. The usage of aggressive language on the Internet is typically referred to as *flaming*, i.e., "expressing oneself more strongly on the computer than one would in other communication settings" (Kiesler et al., 1984, p. 1130). Several early studies suggest that flaming (e.g., "Go die in a hole") is particularly common on the Internet, as compared to face-to-face encounters (e.g., Orengo, Zornoza, Prieto, & Peiro, 2000; Sproull & Kiesler, 1986). A more recent study examined flaming on the popular video sharing website Youtube (Moor, Heuvelman, & Verleur, 2010). The authors investigated a random sample of videos and related comments and showed that in about one third of the cases, the first five postings included at least one flaming comment. Moreover, a majority of Youtube users stated they had often noticed flaming when reading comments on videos. In addition to flaming, which is often targeted at strangers, offensive language on the Internet can be directed at a known person like in cases of online harassment (Jones, Mitchell, & Finkelhor, 2013; Lwin, Li, & Ang, 2012) and cyberbullying (Kowalski, Limber, & Agatston, 2012; Tokunaga, 2010).

Much of the research on the effects of digital media on adolescents addressed the influence of audiovisual physical aggression in digital media, most notably in violent video games, on measures of physical aggression. Research has focused on this type of aggression because it is the most frequently depicted and modeled form of aggression in violent video games (Anderson et al., 2010). Meta-analyses summarizing the findings of cross-sectional, longitudinal, and experimental studies suggest that violent video game play

is a causal predictor of physical aggression (Anderson, 2004; Anderson et al., 2010; Sherry, 2001).

Less is known about the influence of digital media use on verbal aggression which is characterized by a tendency to disagree and to get into arguments with others (Buss & Perry, 1992). Theory suggests that the exposure to strong language and verbal offenses on the Internet increases adolescents' verbal aggression (cf. Anderson & Bushman, 2002). For example, adolescents may acquire insulting phrases online and develop cognitive associations between incidents of potential disagreement and the usage of strong language (Huesmann, 1998; Linder & Gentile, 2009). In line with these predictions, verbal aggression exposure on TV predicted teacher ratings of verbal aggression among fifth grade girls in the US (Linder & Gentile, 2009). We are aware of only one study (Collins, Freeman, & Chamarro-Premuzic, 2012) that focused on verbal aggression as a correlate of Internet use, in that case of playing massively multiplayer online role playing games (MMORPGs). The results of a mixed adolescent and adult sample suggest that those who played MMORPGs and were identified as 'problematic players' scored higher on verbal aggression (the subscale of the questionnaire by Buss & Perry, 1992) than non- MMORPG players. To the best of our knowledge, no other study so far has highlighted the influence of Internet use on users' verbal aggression.

1.2 The Role of Parents (and Peers)

One of the most pressing questions regarding the psychological effects of digital media use is what role parents can play to increase the opportunities and to minimize the risks associated with Internet use. In the field of media influence, parenting practices and

related research has been labeled as *parental mediation* (those practices most often function as independent variables or moderator variables in the statistical sense, though). Research on parental mediation has focused on TV and on children for the most part. However, these lines of research appear to be relevant with respect to older samples and the Internet (Clark, 2011; Livingstone & Helsper, 2008). Two areas of parenting strategies have received particular attention: *Active mediation* or talking with adolescents about the Internet on the one hand and *restrictive mediation* or setting rules and regulations on the other.[1] Research on the TV use of adolescents suggests that active parenting yields more positive results than regulating and restricting adolescents' media use (Nathanson, 1999; 2002; Nathanson & Cantor, 2000). Research on parental mediation practices regarding adolescents' Internet use points in a similar direction. Restriction is often ineffective as Internet activities may take place outside the parents' control, and applications considered safe by parents (such as chatrooms for teenagers, Facebook, or Youtube) can contain improper content (Lee & Chae, 2007; Mesch, 2009; Shin & Huh, 2011). Several studies suggest that active mediation is more successful (Holtz & Appel, 2011; Lee & Chae, 2007). Parent-adolescent conversations can make adolescents aware of the potential opportunities and risks of the Internet. Moreover, it was suggested that adolescents who feel they can talk about the Internet with their parents have more resources available to cope with potential stressors than those who see conversations with their parents about the Internet to be worthless (Appel, Holtz, Stiglbauer, & Batinic, 2012). In line with this assumption, adolescents' reported quality of Internet-related parent-adolescent communication predicted less

[1] Research about parenting with respect to TV use identified a third strategy, co-viewing (e.g., Nathanson, 2002). As Internet use is typically a more private activity than watching TV, results from TV may not be readily applicable to Internet use.

compulsive Internet use (van den Eijnden, Spijkerman, Vermulst, van Rooij, & Engels, 2010). One cross-sectional study investigated the relationship between Internet use and loneliness and the moderating influence of parent-adolescent communication quality (Appel et al., 2012). In line with previous findings (see Huang, 2010, for an overview) amount of Internet use was unrelated to loneliness on average. The authors obtained a significant interaction with the communication quality variable: Internet use was related to more loneliness among adolescents with low Internet-related communication quality whereas no such effect was found among adolescents with high communication quality. This moderation effect was observed even if family support in general terms was controlled for.

Despite the importance of peers in adolescents' life, little research is available on the role that peers might have with respect to the choice and effects of media. Qualitative research suggests that adolescents indeed talk about media frequently with their peers (Suess et al., 1998). One cross-sectional study on the role of parents and peers examined TV use and adolescents' aggression (Nathanson, 2001). This study indicated that adolescent-peer communication about violent content contributed to an acceptance of the violent content which in turn yielded an increase of unwanted effects on aggression scores. Thus, just as conversations about media with parents were found to decrease negative media effects, conversations about media with peers increased negative effects. We are aware of no research that investigated the role of peer-adolescent communication in the field of Internet use.

1.3 The Present Study and Hypotheses

The general aim of the present study was to examine the relationship between Internet use and adolescents' verbal aggression. We were particularly interested in the influence of parent-adolescent communication quality and the influence of peer-adolescent communication quality on this relationship. Our design and operationalization extended previous research in several key regards. First, the majority of previous studies on Internet parental mediation examined Internet-specific criteria of problematic development, such as compulsive Internet use or being a victim of cyberbullying (e.g., Lee & Chae, 2007; Mesch, 2009; van den Eijnden et al., 2010). We extended this research and focused on verbal aggression, a domain-independent indicator of adolescent maladaptation that had received little attention in previous research. Second, much of the previous research on Internet parental mediation emphasized the direct relationship between Internet parenting variables and the criterion of interest (e.g., Holtz & Appel, 2011; Lee & Chae, 2007; Mesch, 2009; van den Eijnden et al., 2010). In the present research, parent-adolescent communication quality was considered to be a moderator; thus, this variable was expected to modify the strength (and direction) of the Internet use-verbal aggression-link. Third, little is known about the role of peers with respect to the effects of adolescent Internet use. To address this lacuna, Internet-related communication quality with peers was included in our design. Fourth, in the field of parental mediation research, most previous studies failed to acknowledge the role of general parent-adolescent (or peer-adolescent)- support. If communication about the Internet was relevant over and above the role of general support, communication quality should have an impact even if family support in general terms was

controlled for. Thus, we included perceived family support (and perceived peer support) as additional control variables. Fifth, research on the relationship between Internet use, indicators of adaptation/maladaptation, and the influence of adolescent-parent communication had mostly been cross-sectional (e.g., Appel et al., 2012; Nathanson, 2001). To disentangle causal influences over time, a longitudinal design was used.

We assumed that for adolescents with low perceived Internet-related communication quality with their parents, Internet use would predict an increase of verbal aggression. For adolescents with high perceived Internet-related communication quality with their parents, this association should be weakened or even reversed. This pattern of results should hold, even if perceived family support in general terms was statistically controlled. We further examined whether perceived communication quality with peers moderated the relationship between Internet use and verbal aggression and whether this variable interacted with the moderator effect of perceived parent communication quality.

2. Method

2.1 Participants and Procedure

The participants of the present study were secondary school students from Germany, aged 10 to 16. As part of a larger research project, they were contacted through online-panels operated by the company EARSandEYES. This company uses a variety of strategies (e.g., banner advertisement, cooperation with journals, phone-recruitment, or refer-a-friend programs) to recruit panel members. Children and adolescents up to 13 years required parental consent for registration as well as for participation in our survey. The data collection was in accordance with national laws as well as the ethical standards and

guidelines of the German Psychological Society (DGPs) and the Association of German Psychologists (BDP).

For the present study, a random sample of panel members were invited twice (time lag of six months) to participate in an online survey. Out of 500 respondents who provided full survey data at Time 1, 370 filled in the whole questionnaire at Time 2; seven respondents did no longer attend school at Time 2 and were excluded from our sample. Thus, the results of the analyses are based on the $n = 363$ students (54.3% female) aged 10 to 16 ($M = 12.84$, $SD = 1.93$) who provided full data at both time points. Results of drop-out analyses (logistic regression, drop-out yes or no as the dependent variable) suggest that drop-out was not systematically related to socio-demographic characteristics (gender, age), $\chi^2 = 1.58$, $df = 2$, $p = .454$, or the initial levels of the studied variables, $\chi^2 = 9.23$, $df = 6$, $p = .161$.

< Table 1 >

2.2 Measures

The measures reported here were included in a larger survey on the relevance of Internet use in adolescents' lives. The means, standard deviations, and zero-order correlations of the variables are displayed in Table 1. All scales showed acceptable or better reliability scores.

2.2.1 Internet use. Internet use was measured in terms of the average time spent on the Internet per day. A nine-point scale was provided that ranged from 0 = *no time to* 9 = *8 hours or more.*

2.2.2 Perceived Internet-related communication quality with parents. This variable was measured with a three-item scale (van den Eijnden et al., 2010). The items ask about the feelings when adolescents talk about their Internet use with their parents ("I feel comfortable", "I feel understood", "I feel taken seriously"). A 5-point response scale was provided (1 = *not true at all* to 5 = *completely true*). The reliability of this scale was good, as indicated by Cronbach's α = .89 (Time 1) and α = .90 (Time 2).

2.2.3 Perceived Internet-related communication quality with peers. As a complement to the communication quality with parents-scale a newly developed scale measured feelings when adolescents talk about their Internet use with their peers ("I feel comfortable", "I feel understood", "I feel taken seriously"). Again, we used the 5-point response format (1 = *not true at all* to 5 = *completely true*), Cronbach's α = .89 (Time 1) and α = .90 (Time 2).

2.2.4 Verbal aggression. Verbal aggression was measured with the 3-item subscale from the 12-item short form of the Buss-Perry Aggression Questionnaire (Bryant & Smith, 2001; Buss & Perry, 1992; Herzberg, 2003). A sample item is "I often find myself disagreeing with people". Each item went with a 5-point scale ranging from 1 = *not true at all* to 5 = *completely true,* Cronbach's α = .69 (Time 1) and α = .71 (Time 2).

2.2.5 Perceived family support. A four item-scale measuring perceived emotional support (Schwarzer & Schulz, 2000) was reformulated to specifically address available support from parents (sample item "Whenever I am not feeling well, my parents show me that they are fond of me."). The items went with a 4-point scale from 1 = *do not agree* to 4 = *agree completely,* Cronbach's α = .90 (Time 1) and α = .90 (Time 2).

2.2.6 Perceived peer support. The four item scale measuring perceived emotional support (Schwarzer & Schulz, 2000) was reworded to ask for available support from peers (sample item “Whenever I am not feeling well, my friends show me that they are fond of me.”). The items went with a 4-point scale from 1 = *do not agree* to 4 = *agree completely*, Cronbach’s α = .90 (Time 1) and α = .90 (Time 2).

< Table 2 >

3. Results

We assumed that perceived Internet-related communication quality with parents and peers would moderate the longitudinal relationship between adolescent Internet use and verbal aggression, even if parent and peer support was controlled for. To test our hypotheses, we conducted a hierarchical regression analysis with verbal aggression at Time 2 as the criterion variable. Gender, age, and verbal aggression at Time 1 as well as family and peer support at Time 1 served as control variables and were entered in Step 1. Time 1 Internet use and perceived communication quality with parents and peers were entered in Step 2. The corresponding two-way interaction effects were included in Step 3, and the three-way interaction effect in Step 4. All continuous variables were *z*-standardized and the interaction terms were calculated on the basis of the standardized variables (Aiken & West, 1991).

Table 2 reports the results of the regression analysis. Among the control variables (Step 1), only prior levels of verbal aggression and perceived peer support were significantly associated with verbal aggression at Time 2. Overall, the amount of Internet use was not significantly related to verbal aggression six months later (Step 2). However,

there was a significant impact of perceived parent-related, but not peer-related communication quality on verbal aggression. Our main assumption referred to an interaction between the amount of Internet use and parent-adolescent communication quality. As predicted, Step 3 of the hierarchical regression analysis showed a significant two-way interaction effect between both variables. The pattern of the two-way interaction effect was as expected: The amount of Internet use was associated with increased levels of verbal aggression among adolescents who reported low communication quality with their parents; among adolescents who reported high communication quality with their parents, the relationship was reversed. Figure 1 illustrates this finding. No significant two-way interaction was observed for communication quality with peers.

< Figure 1 >

Our subsequent analysis addressed the three-way interaction effect between Internet use, parent-, and peer-related communication quality. Step 4 of our hierarchical regression analysis identified a significant three-way interaction.[2] Figure 2 illustrates these results. Simple slope analyses revealed that communication quality with peers significantly moderated the relationship between Internet use and verbal aggression among adolescents who reported *low parent*-related communication (-1*SD*): If communication quality with peers was low as well (-1*SD*), Internet use was not related to verbal aggression at Time 2, *B* = 0.05, *SE* = 0.09, 95% CI [-0.13, 0.23], *t*(352) = 0.54, *p* = .590. However, Internet use was significantly related to higher levels of verbal aggression, if parent-related communication quality was low and peer-related communication quality was high (+1*SD*), *B* = 0.25, *SE* =

[2] We further examined whether this three-way interaction was qualified by a four-way interaction with adolescents' age. This analysis yielded no significant effect, B = 0.05, SE = 0.04, t(352) = 1.27, p = .206, indicating that the three-way interaction is not significantly influenced by a linear increase or decrease in age.

0.11, 95% CI [0.03, 0.47], $t(352) = 2.26$, $p = .024$. Among adolescents who reported *high parent*-related communication quality (+1*SD*), the pattern of moderation tended to be inverted: In that case, Internet use was not associated with verbal aggression, if peer-related communication quality was low (-1*SD*), $B = 0.04$, $SE = 0.15$, 95% CI [-0.25, 0.33], $t(352) = 0.26$, $p = .797$. If, however, peer-related communication quality was high as well (+1*SD*), Internet use had a statistically negative rather than a statistically positive impact on verbal aggression at Time 2, although the simple slope failed to reach significance, $B = -0.11$, $SE = 0.08$, 95% CI [-0.27, 0.05], $t(352) = -1.33$, $p = .184$. In sum, the beneficial effects of high communication quality with peers seem limited. In the case that adolescents have low communication quality with their parents, higher communication quality with peers yields detrimental effects.

< Figure 2 >

4. Discussion

The influence of Internet use on children and adolescents is arguably one of the most intensely debated topics of our time. The present research adds to the knowledge about this matter in several important ways. Content analyses of popular Internet applications and interviews with their users suggest that strong, even offensive language is quite common on the Internet (e.g., Moor et al., 2010). Several theoretical perspectives (e.g., Anderson & Bushman, 2002; Huesmann, 1998) indicate that Internet use, including the exposure to strong language in popular applications, might be related to verbal aggression – a variable that as yet received little attention in research on adolescents' Internet use. We assumed that potential effects of Internet use on verbal aggression were

subject to the influence of parent-adolescent communication quality (cf. Appel et al., 2012; van den Eijnden et al., 2010). Indeed we found that Internet-related communication quality with parents matters: For adolescents who lacked this resource, Internet use predicted an increase in verbal aggression over a period of six months. For adolescents with high scores on communication quality with parents, the relationship was reversed.

This study further extends previous approaches by examining the influence of peers on Internet effects. We found that Internet-related communication quality with peers plays a role among adolescents with low Internet-related communication quality with their parents. In this latter group Internet-related communication quality with peers increased the relationship between Internet use and verbal aggression scores. Whereas high-quality interactions with parents lower the likelihood that Internet use has a negative influence on adolescent development, high-quality interactions with peers – as reported by the adolescents – can have detrimental effects.

Our findings highlight the role that parents can play to make the time spent online a healthy and positive experience (see also Clark, 2011; Subrahmanyam & Smahel, 2011). Our study focused on the quality of parent-adolescent communication (from the adolescents' perspective) and demonstrated its benefits based on a longitudinal design. Our results are in line with research on cyberbullying that revealed that adolescents often do not talk to their parents about their online experiences, even if these experiences are stressful or annoying. Nine out of ten adolescents aged 12 to 17 years refrained from telling their parents about cyberbullying incidents (Juvonen & Gross, 2008). Irrespective of the adolescents' age or gender, one major reason to stay quiet was their concern that parents might restrict their Internet access. This lack of communication has been observed even in

cases where bullying caused severe distress. In such cases talking to parents can prevent fatal consequences as parents may provide psychological support and may initiate actions to stop bullying (Kowalski et al., 2012).

The negative influence of peer-adolescent communication quality given low communication quality with parents is congruent with previous theory and research on peer influence in adolescence. Adolescents spend a substantial amount of time with their peers, who give support, approval, and provide norms that may differ from those in the family (cf. Arnett, 2012). In addition to the adaptive functions of companionship in adolescents, peers play a crucial role in risky or aggressive behavior (e.g., Zimring, 1998). Youth in early to middle adolescence were identified to be particularly sensitive to rewarding peer-related stimuli associated with risk-taking, as compared to children, older adolescents, or adults (Albert, Chein, & Steinberg, 2013; Gardner & Steinberg, 2005). Although studies in the media context are largely missing, there is some evidence from retrospective data (undergraduates remembered thoughts and feelings during high school) that peer discussions of violent TV shows are common and that the frequency of these discussions is related to perceived peer approval of TV aggression, positive attitudes towards TV aggression, and own aggression (Nathanson, 2001).

The present paper was in part based on theory and research in the *parental mediation* tradition which mainly addressed the effects of TV use by children and adolescents. The role of Internet users, however, differs from the role of TV audiences. With the opportunities of the Internet and the activities of its users, the role as a receiver of some pre-determined message becomes less important (Greenfield & Yan, 2006). Thus, a particular consequence of a certain application, a *main effect*, is harder to identify. The

usage of one and the same Internet application can contribute to problem behavior among some participants whereas for others usage might contribute to a healthy development. We tried to deal with this conundrum in two ways. We conceived and assessed Internet use as a broad category and we did not assume to find an average effect of time spent with the Internet on our dependent variable verbal aggression. Rather, we assumed a substantive variance in the positive or negative associations between Internet use and verbal aggression and we assumed that this variance can be explained with the help of moderator variables: parent and peer communication quality.

In our sample girls did not obtain lower aggression scores than boys. This appears to be a noticeable result, as prior theory and research pointed at remarkable gender differences in adolescent aggression (e.g., Maccoby & Jacklin, 1974). Unlike much of the previous work, however, our study examined verbal aggression rather than physical aggression. When verbal aggression was considered separately in prior research, gender differences were small or even absent (cf. Bettencourt & Miller, 1996; Card, Stucky, Sawalani, Little, 2008). Thus, the lack of gender differences corresponds to previous research in the field.

The present work contributes to the current literature in key regards, but its limitations need to be acknowledged. First, our focus had not been on identifying the specific mechanisms that transmit the positive effect of parent-adolescent communication quality to the relationship between Internet use and verbal aggression. We assume that parent-adolescent communication can be effective by shaping the ways in which adolescents use the Internet and parent-adolescent communication can effectively buffer negative effects of risky content and interactions by providing Internet-related backing and advice.

Second, our research was conducted over the Internet which has methodological implications. Today, web-based assessment is a standard method for social scientists, and the psychometric properties of web-based surveys have been satisfactory (cf. Denissen, Neumann, & van Zalk, 2010; Gosling et al., 2004). Research suggests that Internet surveys might be a feasible way to gather information from young adolescents aged 10 and 11 years old (Lloyd & Devine, 2010). However, Internet-based studies profit particularly from brief questionnaires (Dillman, 2000). For the sake of brevity, we decided to use short scales, instead of the scales' long forms. Our reliabilities were at least acceptable; however, future studies about Internet-related communication with parents and peers are encouraged to replicate our findings offline, where administering full scales appears to be more appropriate.

Third, our emphasis was on the adolescents' perspective and the adolescents were our informants. Future research is encouraged to complement this approach with measures that deal with the parents' perspective. This can include parents' self-reported parental mediation strategies or more general variables, such as parenting practices and parenting styles (cf. Spera, 2005).

Fourth, it needs to be noted that many of the observed effects were rather small in size. Adolescents' verbal aggression scores are influenced by many factors – Internet use, Internet-related communication quality, and connected interactions represent only one and likely not the biggest part of these factors. However, given that the delay between changes from Time 1 to Time 2 amounted to no more than six months, the variance explained is remarkable. Additional studies are needed to examine whether the effects observed increase with the length of the delay between the first and the second point of measurement.

5. Conclusion

Internet use brings about opportunities and risks for adolescents. This study showed that Internet-related communication quality with parents and peers determine whether or not more time spent with the Internet is associated with increases in verbal aggression scores over time. Good Internet-related communication quality with parents appears to be a relevant predictor for a healthy development, particularly for adolescents who spend much of their time online.

References

Albert, D., Chein, J., & Steinberg, L. (2013). The teenage brain: Peer influences on adolescent decision making. *Current Directions in Psychological Science, 22*, 114-120. doi: 10.1177/0963721412471347

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Anderson, C. A. (2004). An update on the effects of violent video games. *Journal of Adolescence, 27*, 113-122. doi: 10.1016/j.adolescence.2003.10.009

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*, 27-51. doi: 10.1146/annurev.psych.53.100901.135231

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

Appel, M., Holtz, P., Stiglbauer, B. & Batinic, B. (2012). Parents as a resource: Communication quality affects the relationship between adolescents' Internet use and loneliness. *Journal of Adolescence, 35*, 1641-1648. doi: 10.1016/j.adolescence.2012.08.003

Arnett, J. J. (2012). *Human Development.* Boston, MA: Pearson.

Baumgartner, S. E., Valkenburg, P. M., & Peter, J. (2010). Assessing causality in the relationship between adolescents' risky sexual online behavior and their perceptions

of this behavior. *Journal of Youth and Adolescence, 39*, 1226-1239. doi: 10.1007/s10964-010-9512-y

Bettencourt, B., & Miller, N. (1996). Gender differences in aggression as a function of provocation: a meta-analysis. *Psychological Bulletin, 119*, 422-447. doi*:* 10.1037/0033-2909.119.3.422.

Bryant, F. B., & Smith, B. D. (2001). Refining the architecture of aggression: A measurement model for the Buss-Perry Aggression Questionnaire. *Journal of Research in Personality, 35*, 138-167. doi: 10.1006/jrpe.2000.2302

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

Card, N. A., Stucky, B. D., Sawalani, G. M., & Little, T. D. (2008). Direct and indirect aggression during childhood and adolescence: A meta-analytic review of gender differences, intercorrelations, and relations to maladjustment. *Child Development, 79*, 1185-1229. doi: 10.1111/j.1467-8624.2008.01184.x

Clark, L. S. (2011). Parental mediation theory for the digital age. *Communication Theory, 21*, 323-343. doi: 10.1111/j.1468-2885.2011.01391.x

Collins, E., Freeman, J., & Chamarro-Premuzic, T. (2012). Personality traits associated with problematic and non-problematic massively multiplayer online role playing game use. *Personality and Individual Differences, 52*, 133-138. doi: 10.1016/j.paid.2011.09.015

Dillman, D. A. (2000). *Mail and Internet surveys: The tailored design method.* New York, NY: Wiley.

Fox, F. E., Rumsey N., & Morris, M. (2007). "Ur skin is the thing that everyone sees and you can't change it!": Exploring the appearance-related concerns of young people with psoriasis. *Developmental Neurorehabilitation, 10,* 133-141. doi: 10.1080/13638490701217594

Gardner, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and risky decision making in adolescence and adulthood: An experimental study. *Developmental Psychology, 41,* 625-635. doi: 10.1037/0012-1649.41.4.625

Gentile, D. A., & Walsh, D. A. (2002). A normative study of family media habits. *Journal of Applied Developmental Psychology, 23,* 157-178. doi: 10.1016/S0193-3973(02)00102-8

Gosling, S.D., Vazire, S., Srivastava, S., & John, O. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about internet questionnaires. *American Psychologist, 59,* 93-104. doi: 10.1037/0003-066X.59.2.93

Greenfield, P., & Yan, Z. (2006). Children, adolescents, and the Internet: A new field of inquiry in developmental psychology. *Developmental Psychology, 42,* 391-394. doi: 10.1037/0012-1649.42.3.391

Herzberg, P. Y. (2003). Faktorstruktur, Gütekriterien und Konstruktvalidität der deutschen Übersetzung des Aggressionsfragebogens von Buss und Perry. *Zeitschrift für Differentielle und Diagnostische Psychologie, 24,* 311-323. doi: 10.1024/0170-1789.24.4.311

Holtz, P., & Appel, M. (2011). Internet use and video gaming predict problem behavior in early adolescence. *Journal of Adolescence, 34,* 49-58. doi: 10.1016/j.adolescence.2010.02.004

Huang, C. (2010) Internet use and psychological well-being: A meta-analysis. *Cyberpsychology, Behavior, and Social Networking, 13*, 241-249. doi: 10.1089/cyber.2009.0217

Huesmann, L. R. (1998). The role of social information processing and cognitive schema in the acquisition and maintenance of habitual aggressive behavior. In R. G. Geen & E. Donnerstein (Eds.), *Human aggression: Theories, research, and implications for social policy* (pp. 73-109). New York, NY: Academic Press. doi: 10.1016/B978-012278805-5/50005-5

Jones, L. M., Mitchell, K. J., & Finkelhor, D. (2013). Online harassment in context: Trends from three Youth Internet Safety Surveys (2000, 2005, 2010). *Psychology of Violence, 3*, 53-69. doi: 10.1037/a0030309

Juvonen, J., & Gross, E. F. (2008). Extending the school grounds?—Bullying experiences in cyberspace. *Journal of School Health, 78*, 496-505.

Kiesler, S., Siegel, J., McGuire, T. W. (1984). Social psychological aspects of computer-mediated communication. *American Psychologist, 39*, 1123-1134. doi: 10.1037/0003-066X.39.10.1123

Kowalski, R. M., Limber, S. P., & Agatson, P. W. (2012). *Cyberbullying. Bullying in the digital age*. Chichester, UK: Wiley-Blackwell.

Lee, S.-J., & Chae, Y.-G. (2007). Children's Internet use in a family context: Influence on family relationships and parental mediation. *CyberPsychology & Behavior, 10*, 640-644. doi: 10.1089/cpb.2007.9975

Linder, J. R., & Gentile, D. A. (2009). Is the television rating system valid? Indirect, verbal, and physical aggression in programs viewed by fifth grade girls and associations

with behavior. *Journal of Applied Developmental Psychology, 30*, 286-297. doi: 10.1016/j.appdev.2008.12.013

Livingstone, S., & Helsper, E. J. (2008). Parental mediation of children's Internet use. *Journal of Broadcasting and Electronic Media, 52*, 581-599. doi: 10.1080/08838150802437396

Lloyd, K., & Devine, P. (2010). Using the internet to give children a voice: an online survey of 10-and 11-year-old children in Northern Ireland. *Field Methods, 22*, 270-289. doi: 10.1177/1525822X10374279

Lwin, M. O., Li, B., & Ang, R. P. (2012). Stop bugging me: An examination of adolescents' protection behavior against online harassment. *Journal of Adolescence, 35*, 31-41. doi: 10.1016/j.adolescence.2011.06.007

Maccoby, E. E., & Jacklin, C. N. (1974). *The psychology of sex differences.* Stanford, CA: Stanford University Press.

Mesch, G. S. (2009). Parental mediation, online activities, and cyberbullying. *CyberPsychology & Behavior, 12*, 387-393. doi: 10.1089/cpb.2009.0068

Moor, P. J., Heuvelman, A., & Verleur, R. (2010). Flaming on youtube. *Computers in Human Behavior, 26*, 1536-1546. doi: 10.1016/j.chb.2010.05.023

Nathanson, A. I. (1999). Identifying and explaining the relationship between parental mediation and children's aggression. *Communication Research, 26*, 124-143. doi: 10.1177/009365099026002002

Nathanson, A. I. (2001). Parents versus peers exploring the significance of peer mediation of antisocial television. *Communication Research, 28*, 251-274. doi: 10.1177/009365001028003001

Nathanson, A. I. (2002). The unintended effects of parental mediation of television on adolescents. *Media Psychology, 4*, 207-230. doi: 10.1207/S1532785XMEP0403_01

Nathanson, A. I., & Cantor, J. (2000). Reducing the aggression-promoting effect of violent cartoons by increasing children's fictional involvement with the victim: A study of active mediation. *Journal of Broadcasting & Electronic Media, 44*, 125-142. doi: 10.1207/s15506878jobem4401_9

Orengo, V., Zornoza, A. M., Prieto, F., & Peiró, J. M. (2000). The influence of familiarity among group members, group atmosphere and assertiveness on uninhibited behavior through three different communication media. *Computers in Human Behavior, 16*, 141-159. doi: 10.1016/S0747-5632(00)00012-1

Peter, J., & Valkenburg, P. M. (2011). The use of sexually explicit internet material and its antecedents: A longitudinal comparison of adolescents and adults. *Archives of Sexual Behavior, 40*, 1015-1025. doi: 10.1007/s10508-010-9644-x

Peter, J., Valkenburg, P. M., & Schouten, A. P. (2005). Developing a model of adolescent friendship formation on the Internet. *Cyberpsychology & Behavior, 8*, 423-430. doi: 10.1089/cpb.2005.8.423

Postmes, T., & Spears, R. (1998). Deindividuation and antinormative behavior: A meta-analysis. *Psychological Bulletin, 123*, 238-259. doi: 10.1037/0033-2909.123.3.238

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). *Generation M². Media in the lives of 8- to 18-year-olds*. Kaiser Family Foundation. Accessed on April 16, 2013 at http://kff.org/entmedia/upload/8010.pdf

Reich, S. M., Subrahmanyam, K., & Espinoza, G. (2012). Friending, IMing, and hanging out face-to-face: Overlap in adolescents' online and offline social networks. *Developmental Psychology, 48*, 356-368. doi: 10.1037/a0026980

Schwarzer, R., & Schulz, U. (2000). *Berlin Social Support Scales (BSSS)*. Available at http://userpage.fu-berlin.de/~health/soc_e.htm

Shin, W., & Huh, J. (2011). Parental mediation of teenagers' video game playing: Antecedents and consequences. *New Media & Society, 13*, 945-962. doi: 10.1177/1461444810388025

Slater, A., & Tiggemann, M. (2010). Body image and disordered eating in adolescent girls and boys: A test of objectification theory. *Sex Roles, 63*, 42-49. doi: 10.1007/s11199-010-9794-2

Spera, C. (2005). A review of the relationship among parenting practices, parenting styles, and adolescent school achievement. *Educational Psychology Review, 17*, 125-146.

Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. *Management Science, 32*, 1492-1512. doi: 10.1287/mnsc.32.11.1492

Subrahmanyam, K., & Lin, G. (2007). Adolescents on the Net: Internet use and well-being. *Adolescence, 42*, 659-677.

Subrahmanyam, K., & Smahel, D. (2011). *Digital Youth.* New York: Springer.

Suess, D., Suoninen, A., Garitaonandia, C., Juaristi, P., Koikkalainen, R., & Oleaga, J. A. (1998). Media use and the relationships of children and teenagers with their peer groups. A study of Finnish, Spanish and Swiss cases. *European Journal of Communication, 13*, 521-538. doi: 10.1177/0267323198013004005

Tokunaga, R. S. (2010) Following you home from school: A critical review and synthesis of research on cyberbullying victimization. *Computers in Human Behavior, 26,* 277-287. doi: 10.1016/j.chb.2009.11.014

Valkenburg, P. M., & Peter, J. (2011). Adolescents' online communication: An integrated model of its attraction, opportunities, and risks. *Journal of Adolescent Health, 48,* 121-127. doi: 10.1016/j.jadohealth.2010.08.020

Van den Eijnden, R. J. J. M., Spijkerman, R., Vermulst, A.A., van Rooij, T. J., & Engels, R. C. M. E. (2010). Compulsive Internet use among adolescents: Bidirectional parent–child relationships. *Journal of Abnormal Child Psychology, 38,* 77-89. doi: 10.1007/s10802-009-9347-8

Zimring, F. (1998). *American youth violence: Studies in crime and public policy*. New York, NY: Oxford University Press.

Table 1

Means, Standard Deviations, and Intercorrelations of the Studied Variables

		M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Gender[a] T1	0.54	0.50														
2	Age T1	12.83	1.93	.10													
3	Internet use T1	4.20	1.58	.08	.57***												
4	Internet use T2	4.28	1.73	.06	.54***	.68***											
5	General family support T1	3.59	0.58	-.03	-.29***	-.22***	-.16**										
6	General family support T2	3.58	0.56	-.00	-.20***	-.13**	-.14**	.61***									
7	General peer support T1	3.33	0.59	.21***	-.03	-.03	-.00	.35***	.23***								
8	General peer support T2	3.33	0.58	.18***	.06	.04	.03	.28***	.42***	.53***							
9	Communication quality with parents T1	3.58	0.92	-.03	-.11*	-.04	-.07	.46***	.37***	.18***	.14**						
10	Communication quality with parents T2	3.60	0.94	.03	-.10	-.09	-.19***	.34***	.46***	.15**	.24***	.53***					
11	Communication quality with peers T1	3.77	0.84	.05	.11*	.14**	.09	.21***	.10*	.34***	.20***	.53***	.23***				
12	Communication quality with peers T2	3.88	0.79	.05	.14**	.08	.07	.12*	.18***	.23***	.42***	.17***	.44***	.41***			
13	Verbal aggression T1	2.43	0.78	-.03	.07	.11*	.10	-.17**	-.15**	-.23***	-.13*	-.14*	-.18***	-.08	-.04		
14	Verbal aggression T2	2.40	0.78	-.04	.03	.06	.00	-.14**	-.22***	-.21***	-.22***	-.20***	-.24***	-.12*	-.13*	.43***	

Note. $N = 363$

[a] 0 = male, 1 = female

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

Table 2

Hierarchical Linear Regression, Verbal Aggression at Time 2 as the Criterion

	Step 1			Step 2			Step 3			Step 4		
Variable	*B*	SE_B	*p*	*B*	SE_B	*p*	*B*	SE_B	*p*	*B*	SE_B	*p*
Intercept	0.00	0.05	1.00	0.00	0.05	1.00	0.02	0.05	.641	-0.02	0.05	.677
1. Gender[a]	-0.00	0.05	.940	-0.01	0.05	.877	-0.01	0.05	.908	0.00	0.05	.938
2. Age	-0.02	0.05	.716	-0.03	0.06	.556	-0.02	0.06	.714	-0.02	0.06	.683
3. Verbal aggression at Time 1	0.40	0.05	<.001	0.39	0.05	<.001	0.41	0.05	<.001	0.42	0.05	<.001
4. Family support	-0.04	0.05	.423	0.02	0.06	.672	0.03	0.06	.564	0.03	0.06	.623
5. Peer support	-0.11	0.05	.043	-0.11	0.06	.040	-0.12	0.06	.039	-0.12	0.06	.031
6. Internet use				0.03	0.06	.599	0.02	0.06	.775	0.06	0.06	.369
7. Communication quality parents				-0.16	0.06	.012	-0.13	0.06	.040	-0.10	0.07	.122
8. Communication quality peers				0.03	0.06	.609	0.01	0.06	.894	0.01	0.06	.941
10. Communication quality parents x communication quality peers							0.02	0.04	.513	-0.01	0.04	.857
11. Internet Use x communication quality parents							-0.12	0.06	.039	-0.09	0.06	.122
12. Internet use x communication quality peers							0.05	0.06	.426	0.01	0.06	.836
13. Internet use x communication quality parents x communication quality peers										-0.09	0.04	.025
R^2 (Adj. R^2)	.20 (.19)			.22 (.20)			.23 (.20)			.24 (.21)		
ΔR^2	.20			.02			.01			.01		
F	18.00		< .001	12.33		< .001	9.40		< .001	9.13		< .001
ΔF	18.00		< .001	2.49		.060	1.46		.225	5.05		.025

Note. $N = 363$.

[a] Effect-coded with -1 = male and 1 = female.

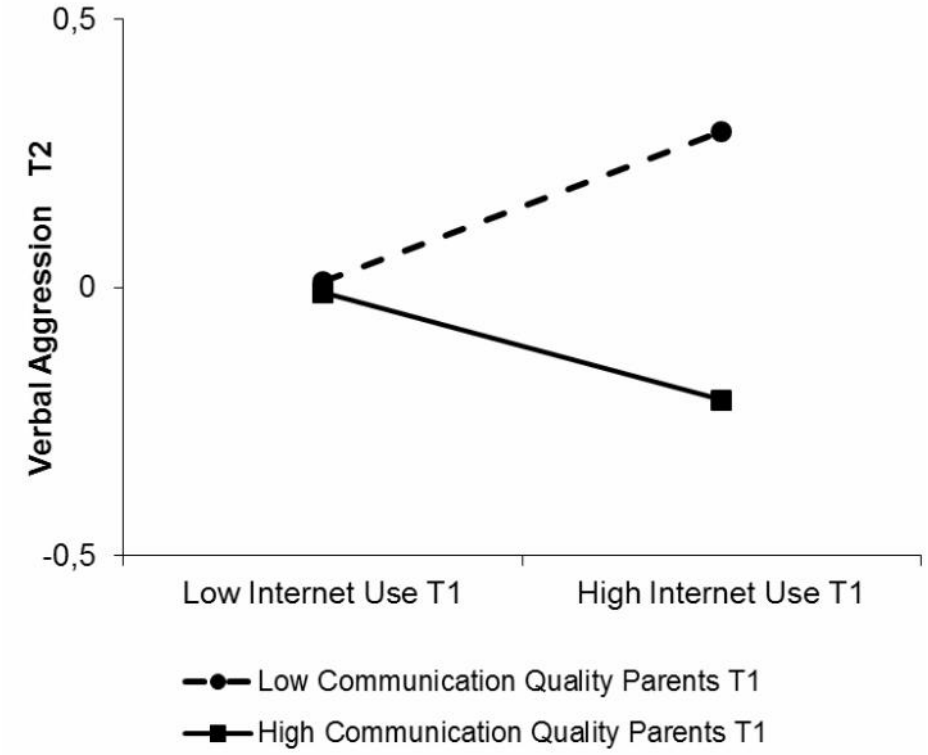

Figure 1

Interaction Between Internet Use and Parent-Related Communication Quality on Verbal Aggression.

Note. Solid lines vs. dashed lines indicate high (+1 *SD*) vs. low (-1 *SD*) communication quality with parents.

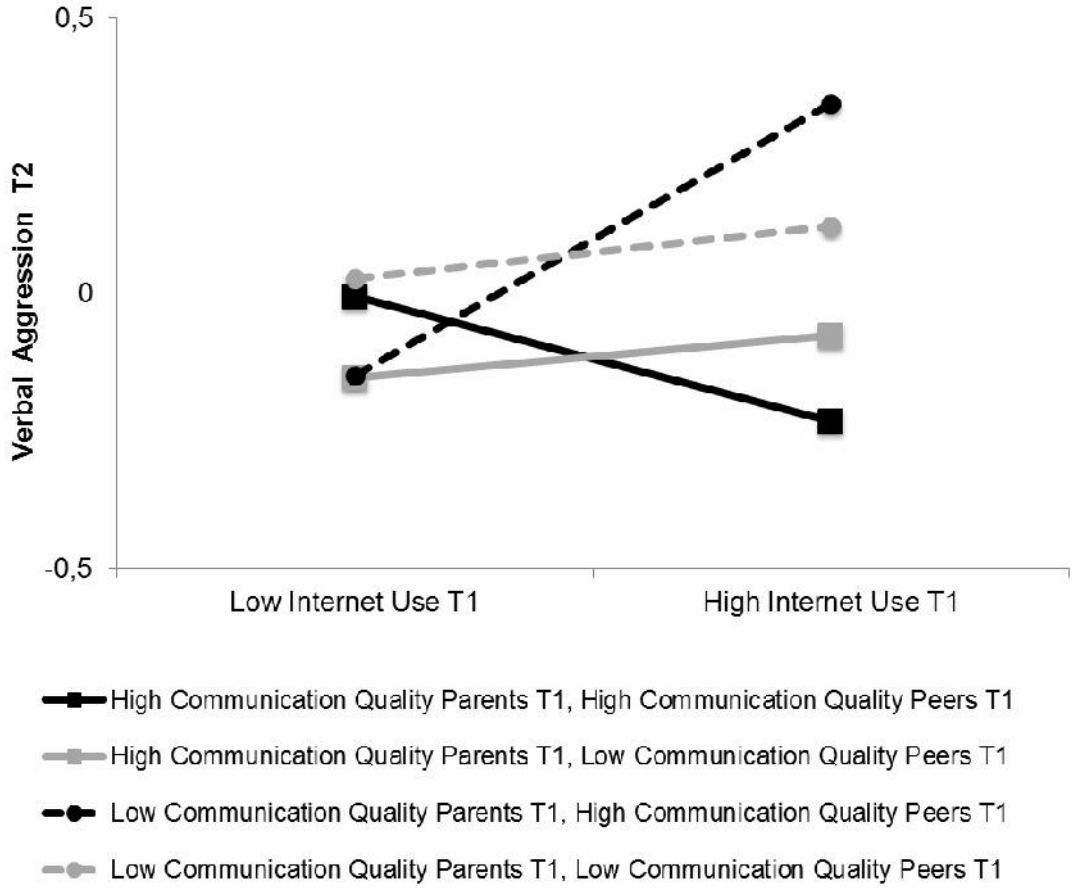

Figure 2

Interaction Between Internet Use and Parent and Peer Communication Quality on Verbal Aggression.

Note. Solid vs. dashed lines indicate high (+1 *SD*) vs. low (-1 *SD*) communication quality with parents; black vs. grey lines indicate high (+1 *SD*) vs. low (-1 *SD*) communication quality with peers.