

Media Use and Adolescent Psychological Adjustment: An Examination of Gender Differences

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Abstract This study examined media use and psychological adjustment (as indicated by depression and anxiety symptomatology) in a sample of 328 14- to 16-year-old adolescents. Primary goals of the study were to explore whether media use differs by gender, whether media use is related to adolescent psychological problems, and whether media use moderates the relationship between parental alcoholism and adolescent psychological adjustment. Adolescents were surveyed in the spring of 2006, and again one year later. Gender differences in media use were observed with boys spending more time playing video games than girls and girls spending more time talking on the phone than boys. Strikingly, none of the types of media examined was associated with depression or anxiety. Moreover, media use acted as a protective factor for boys. Boys who spent relatively more time playing video games and watching television had the lowest levels of anxiety, especially those from alcoholic homes. The opposite pattern emerged for girls.

Keywords Adolescence · Media · Anxiety · Depression · Parental alcoholism

Introduction

The world that adolescents live in today is markedly different from the one that their parents experienced as adolescents, largely due to advances in technology. A

generation ago, the Internet, PlayStation, Nintendo, GameBoy, XBOX, cell phones, text messaging, IMing, e-mail, and IPODS were unheard of. Today, they are central components of the lives of adolescents. It is estimated that the average adolescent spends about 46 min a day using the Internet (Gross et al. 2002; Woodward 2002), 20–60 min a day playing video games (Marshall et al. 2006; Roberts et al. 1999), 90 min a day listening to music (Roberts et al. 1999), 64 min a day talking on the phone (Gross et al. 2002), 28 min a day IMing (Gross et al. 2002), and 20 min a day using e-mail (Gross et al. 2002). Interestingly, the primary technological activity available to adolescents' parents' generation when they were adolescents, television, is still the one used most frequently, with today's adolescents watching 1.8–3.6 hour of television a day (Gentile et al. 2004; Marshall et al. 2006; Roberts et al. 1999).

Importantly, research indicates that these prevalence rates may differ by gender. For example, a number of studies have shown that boys spend more time playing video games and computer games in comparison to girls (Durkin and Barber 2002; Gentile et al. 2004; Marshall et al. 2006). Similarly, recent research suggests that boys spend more time watching television in comparison to girls (Gentile et al. 2004; Marshall et al. 2006). There is much less information pertaining to gender differences in the other types of media that adolescents use. Moreover, the few studies that have examined gender differences in the use of other types of media have yielded mixed results. For example, Hunley et al. (2005) found that girls spend more time talking on the phone than boys, whereas Gross et al. (2002) found no gender difference in phone use. This discrepancy in results may be related to differences in the samples assessed (e.g., Hunley et al.'s sample included 10th grade students, whereas Gross et al.'s sample included 7th grade students). The findings concerning gender

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differences in Internet use also are mixed. For example, Subrahmanyam et al. (2001) found that boys were heavier users of the Internet than girls during adolescence. In contrast, Gross (2004) did not find gender differences in Internet use in her sample of 7th and 10th grade students. Similarly, Hunley et al. did not observe gender differences in their sample of 10th grade students when different types of Internet activities were examined (e-mailing, chatting on the Internet, or visiting web sites). However, it should be noted that the Subrahmanyam et al. study included a much wider age range (10–19 year olds) in comparison to the Gross and Hunley et al. studies. This difference in sample characteristics may account for the discrepancy in results across studies.

According to models of human development (e.g., developmental contextualism, Lerner 1986, 1991; Lerner and Tubman 1991; and the ecological perspective, Bronfenbrenner 1979; Bronfenbrenner and Crouter 1982), development is the result of the *interaction* between characteristics of the individual *and* his or her context. Since the use of media is becoming more central to the daily lives of adolescents, it is essential that the possible impact that this rapidly emerging context has on adolescents be understood. A primary concern is that media based activities are sedentary activities and too much time spent in these activities may ultimately affect the physical and psychological health of adolescents. More specifically, according to the displacement hypothesis (Huston et al. 1992; Kraut et al. 1998), time spent involved in sedentary media based activities (e.g., playing video games) may take the place of time that could be spent participating in more productive and/or active activities (e.g., homework, sports, family interactions). Consistent with this hypothesis, time spent watching television and playing video games has been found to be associated with physical inactivity, weight, and body fat during adolescence (Koezuka et al. 2006; Kraut et al. 1998; Marshall et al. 2004). Recent research also indicates that time spent playing video games, watching television, or talking on the phone during adolescence may negatively impact grades (Gentile et al. 2004). It should be noted, however, that the frequency of use appears to be a key factor that needs to be taken into account when examining the associations between media use and adolescent adjustment. For example, in a study examining 16-year-old adolescents, Durkin and Barber (2002) found that adolescents who reported a high frequency of computer game playing had lower grades than those who reported a low frequency of computer game playing.

Theoretical frameworks such as social learning theory (Bandura 1973, 1986) also suggest that the use of media (particularly computer and video games) may negatively affect adolescents because adolescents may model the

negative behavior that they are exposed to. For instance, studies have found that playing violent video games is associated with aggressive behavior and fighting (Anderson and Bushman 2001; Gentile et al. 2004). However, it is important to note that many of the investigations conducted within this area to date have methodological weaknesses.

Only a handful of studies have examined the relations between media use and adolescent psychological adjustment. Moreover, results from these studies are quite mixed. For example, some studies have yielded significant associations between Internet use and adolescent psychological problems (loneliness, depression, and anxiety) (Kraut et al. 1998), whereas others have not (Gross et al. 2002; Gross 2004). Differences in methodology, samples, and measures may account for the discrepancy in findings across these studies. It also is important to note that these studies included small and/or non-representative samples. In addition, with the exception of the Internet, the relations between other types of media use (e.g., e-mailing, IMing, text messaging) and psychological adjustment have been relatively unexplored. Clearly, more research focusing on the use of different types of media and adolescent psychological problems needs to be conducted.

It is interesting that even less attention has been devoted to the potential benefits that the use of media may have on adolescents. Nevertheless, research has shown that media use during adolescence may have positive effects. For instance, the use of computer games and video games has been found to enhance visual processing and cognitive skills (Green and Bavelier 2003; Green and Bavelier 2007; Subrahmanyam et al. 2001). A study conducted on Dutch adolescents also found that online communication was positively associated with reported closeness of friendships (for those who communicated online with existing friends) (Valkenburg and Peter 2007).

In an important study conducted by Durkin and Barber (2002), both negative *and* positive correlates of computer game playing were examined in a sample of 10th grade students. In contrast to popular belief, results indicated that adolescents who played computer games were better adjusted than those who did not. More specifically, game players were found to have higher levels of self-esteem, lower levels of substance use, to be more attached to and involved with school, and to have closer family relationships in comparison to those who did not play computer games. Durkin and Barber (2002) found little support for the premise that game playing is associated with negative outcomes. Their study clearly made an important contribution to the literature. Nevertheless, it should be noted the data were rather dated (data collection took place in 1988) and the focus was solely on computer games (video games and other types of media were not assessed). This is an important limitation because technology and the manner in

which adolescents use media are changing at a rapid pace. Therefore, a goal of the present study was to extend the Durkin and Barber study to adolescents today and to examine the relations between various types of media and adolescent adjustment.

Research examining the relations between media use and adolescent adjustment has been extremely lop-sided, with the majority of studies focusing on the negative effects of media use. It is encouraging that investigators are beginning to consider potential positive effects of media use during adolescence. Although yet to be explored, it also is plausible that media use may serve as a protective factor for some adolescents. That is, the use of media may “protect” some adolescents who are at an elevated risk for experiencing psychological problems. The present study sought to explore this hypothesis by examining the use of media in adolescents that have an alcoholic parent. Along with having an increased risk for the development of substance abuse problems themselves (Ohannessian et al. 2005; Walden et al. 2007), research has shown that adolescents with an alcoholic parent have higher levels of internalizing and externalizing symptomatology in comparison to those without an alcoholic parent (Hussong et al. 1998; Rodney and Mupier 1999).

According to the Dynamic Diathesis-Stress model (derived from broader models of human development—developmental contextualism, the ecological approach; Windle and Tubman 1999), adjustment is the result of the *interaction* between characteristics of the individual and environmental stressors. More specifically, genetic and environmental risk factors are believed to interact to produce development (Windle and Tubman 1999). A key component of this model is that it is a *multivariate* model, suggesting that many characteristics of the individual and the environment interact to produce development. Therefore, even if an adolescent is at risk for developing problems because of his/her genetic makeup, environmental factors play a role in whether the genetic risk is manifested.

In line with this conceptual reasoning, not all children of alcoholic parents (COAs) develop problems. Consistent with developmental contextualism and the ecological approach, a developmental psychopathology perspective (Cicchetti and Garnezy 1993; Cicchetti and Rogosch 2002) purports that the development of psychological problems depends on the dynamic interaction between the individual and the individual’s contexts (Sameroff, 2001). A central developmental psychopathology concept is multifinality—the notion that diverse outcomes may result from the same starting point. For example, if a group of COAs was followed into adulthood, some would eventually develop alcoholism. However, others might never develop alcoholism, but they might develop psychological

problems such as depression or anxiety. Finally, others might develop into well-adjusted adults. As such, it is imperative to examine variables that may have moderating effects on the relationship between parental alcoholism and adolescent adjustment.

Results from empirical studies have indicated that characteristics of the environment may moderate the relationship between parental alcoholism and adjustment. For example, offspring of alcoholic parents whose families have not disrupted their family rituals have been found to be less likely to become alcoholic than those whose family rituals have become disrupted (Wolin et al. 1979, 1980). Similar moderating effects have been found for family conflict (Werner 1986), family cohesion (Clair and Genest 1987), and for parental monitoring (Chassin et al. 1993; Tebes et al. 2001).

With the exception of the family environment, the role that contextual moderators play in the relationship between parental alcoholism and adjustment has been relatively neglected. As noted previously, one context that has become increasingly important in the lives of adolescents is the world of media. The potential moderating role that media use has on the relationship between parental alcoholism and adolescent adjustment has yet to be explored. However, it is quite plausible that media use protects some adolescents from developing problems. For instance, certain types of media (e.g., video games, watching television, surfing the web) may provide some adolescents with a means to psychologically escape from their problems. In essence, such media use may serve to help adolescents cope by disengaging from their problems, which may be psychologically adaptive according to coping and motivational theories (e.g., Klinger 1975). Other types of media (e.g., IMing, texting, talking on the phone) may “protect” an individual from experiencing psychological problems by increasing social support, which according to coping theories (e.g., Carver et al. 1989), may be adaptive by allowing an individual to receive reassurance, vent their feelings, and receive advice. However, because research conducted to date has primarily focused on the negative aspects of media use during adolescence, the potential protective effects of media use have not yet been systematically examined.

In sum, the present study sought to extend the current literature by exploring the relationships between media use and psychological adjustment (anxiety and depression) in a large, diverse community sample of adolescent boys and girls. More specifically, the following research questions were addressed (1) What is the prevalence of media use (frequency of television viewing, talking on the phone, e-mailing/IMing, text messaging, playing video games, and “surfing the web”) during adolescence? (2) Does the prevalence of media use differ by (a) gender and/or (b) the

presence of parental alcoholism? (3) Is media use related to adolescent psychological adjustment (as indicated by anxiety and depression)? (4) Does media use moderate the relationship between parental alcoholism and adolescent psychological adjustment? If so, does the moderating effect differ depending on the gender of the adolescent?

Method

Participants

The sample included 328 14- to 16-year-old adolescents (58% girls) who were given surveys in the spring of 2006 and the spring of 2007. At the beginning of the study (Time 1), the mean age of the adolescents was 14.99 ($SD = .70$). All of the participants were 9th or 10th grade students attending public high schools in Delaware, Maryland, or Pennsylvania. The sample was fairly diverse. Forty-one percent of the adolescents were Caucasian, 22% were African-American, 24% were Hispanic, and 5% were Asian; the remaining adolescents chose “other” to describe their race/ethnicity. These percentages are fairly reflective of the area from which the sample was drawn (39% Caucasian, 45% African-American, 11%, Hispanic, 5% Asian; U.S. Census Bureau 2007). Most of the mothers (96%) and fathers (95%) had completed high school; some (26% of mothers and 24% of fathers) had completed 4 years of college. The majority of the adolescents lived with both of their biological parents (52%); 83% lived with their biological mother, 12% lived with a step father, 3% lived with a step mother, 1% lived with an adoptive mother, and 1% lived with an adoptive father.

Measures

The adolescents completed a self-report survey in school. The survey included measures of family functioning, social support, perceived competence, media use, involvement in extracurricular activities, adolescent psychological problems, and adolescent and parent substance use. The measures used specifically in this study are discussed in detail below.

Parental Alcoholism

The Children of Alcoholics Screening Test-6 (CAST; Jones 1981) was used to assess parental alcohol use. The CAST-6 is a 6-item measure that focuses on children’s perceptions and experiences relating to their parents’ use of alcohol. Representative items include “Have you ever thought that one of your parents had a drinking problem?” and “Did you ever feel like hiding or emptying a parent’s bottle of

liquor, wine, beer, etc.?” For each CAST item, the adolescent was asked to state whether their answer was in reference to their biological mother, biological father, step mother, step father, adoptive mother, or adoptive father. The response codes for the items were 0 = *no* and 1 = *yes*. The six items were summed to create a scale score for each parental figure. Prior research (Hodgins and Shimp 1995) has indicated that a cutoff of “2” be used to indicate parental alcoholism. Therefore, in the present study, an adolescent who had a biological father or biological mother with a CAST score of 2 or greater was classified as having an alcoholic parent.

Previous studies have supported the validity and reliability of this instrument and its usefulness with adolescent samples (Clair and Genest 1992; Dinning and Berk 1989; Roosa et al. 1988). For instance, Hodgins and Shimp (1995) found a test–retest reliability of .94 for the CAST-6 over a one week period. The CAST-6 also has been shown to be correlated with other measures of parental alcohol use (Clair and Genest 1992).

Adolescent Media Use

All of the adolescents were asked to complete a media use questionnaire. They were asked to indicate how much time they spent doing each activity listed “on an average/typical day.” The activities included watching television, talking on the phone, text messaging, e-mailing/IMing, playing video games (PlayStation, Nintendo, Game Boy, Xbox, etc.) or computer games, and “surfing the Web.” The response scale was 1 = *none*, 2 = *less than one hour*, 3 = *about one hour*, 4 = *about 2 hours*, 5 = *about three hours*, and 6 = *4 or more hours*.

Adolescent Depression

The Center for Epidemiological Studies Depression Scale for Children (CES-DC; Weissman et al. 1980) was used to assess adolescent depressive symptomatology. This widely used self-report measure includes 20-items. Sample items are “I wasn’t able to feel happy, even when my family or friends tried to help me feel better” and “I felt like crying.” Adolescents were asked to respond to the items in regard to how they felt or acted during the past week, on a 4-point Likert-type scale ranging from 1 = *not at all* to 4 = *a lot*. The 20 CES-DC items were summed to create a total depressive symptomatology score, with higher scores reflecting higher levels of depressive symptomatology.

Previous research using adolescent samples has shown that the CES-DC has good psychometric properties (Faulstich et al. 1986; Ohannessian et al. 1999). In the present sample, the Cronbach alpha coefficient for the CES-DC was .91.

Adolescent Anxiety

The 41-item Screen for Child Anxiety Related Disorders (SCARED; Birmaher et al. 1995) was used to assess adolescent anxiety. Representative items include “I get really frightened for no reason at all” and “I am nervous.” Respondents are asked to complete the SCARED in reference to the last three months using a scale that ranges from 0 = *not true or hardly ever true* to 2 = *very true or often true*. Specific SCARED items may be summed to reflect different anxiety disorders (e.g., Generalized Anxiety Disorder, Social Anxiety Disorder). Alternatively, a total score may be calculated to reflect an overall level of anxiety symptomatology. The total score was used in the present investigation.

The SCARED has been shown to have good reliability (e.g., internal consistency, test–retest reliability) and validity characteristics (e.g., concurrent validity, discriminant validity) (Birmaher et al. 2003; Muris et al. 2002). In the present sample, the Cronbach alpha coefficient for the SCARED total score was .91.

Procedures

High schools in Delaware, Southeastern Pennsylvania, and Northern Maryland were invited to participate in the study. The principals from five public high schools in this area agreed to have their school participate. These schools included a total of 1,935 9th- and 10th-grade students, yielding a participation rate of 18% (341 participated; 328 had complete data). All but one of the students who did not participate did not do so because the parental consent form was not returned. In order to increase the participation rate, a passive parental consent procedure was approved by the university’s human subjects committee for Time 2. As a result, the participation rate increased from 18% at Time 1 to 71% at Time 2. Nevertheless, as noted in the participants section, the sample at Time 1 reflected the demographics of the schools and the community.

Early in 2006, parental consent forms and adolescent assent forms were mailed to all parents of 9th and 10th grade students attending the participating high schools. A cover letter instructed parents and adolescents to complete the forms by checking whether they wanted to participate in the study and signing and returning the forms to the research project in the provided prepaid envelope or to the school. During the spring (March–May of 2006), adolescents who provided assent, and whose parents also provided consent, were administered a self-report survey at school by trained research personnel (all of whom were certified with human subjects training). The participants were reassured that the data collected were confidential, that participation was voluntary, and that they could

withdraw from the study at any time. In addition, they were informed that an active Certificate of Confidentiality from the U.S. government was in place to further protect their privacy. The survey took approximately 40 min to complete. Upon completion of the survey, the adolescents were given a movie pass for their participation.

All of the adolescents who participated at Time 1 were again invited to participate in the spring of the following year (Time 2). Fifty-nine percent of the students agreed to participate again at Time 2. Students who participated in the survey at both times of measurement (the longitudinal sample) were compared to those who participated on only one occasion to examine whether these subsamples systematically differed from one another. No differences were found for the majority (75%) of the study variables. However, more students in the longitudinal subsample than in the non-longitudinal subsample had high levels of text messaging (30 and 20%, respectively; $\chi^2(1) = 3.90, p < .05$). In contrast, more students in the non-longitudinal subsample than in the longitudinal subsample had high levels of video game playing (44 and 32%, respectively; $\chi^2(1) = 4.13, p < .05$). No other differences between these subsamples were observed.

Results

The Prevalence of Media Use

At the beginning of the study, adolescents reported spending about 2 hour a day watching television (mean = 4.16, SD = 1.36), one and one half hours a day talking on the phone (mean = 3.41, SD = 1.60), one hour a day “surfing the Web” (3.19, SD = 1.61), almost 1 hour a day e-mailing/IMing (mean = 2.76, SD = 1.66), less than 1 hour a day text messaging (mean = 2.16, SD = 1.53), and less than 1 hour a day playing video games (mean = 2.44, SD = 1.59).

The Effects of Parental Alcoholism and Gender on Media Use

A Multivariate Analysis of Variance (MANOVA) was conducted to examine the effects of parental alcoholism and gender on media use. The dependent variables in this model were frequency of television viewing, talking on the phone, playing video games, e-mailing/IMing, text messaging, and “surfing the web.” The design factors were parental alcoholism and gender. The multivariate effect was significant [$F(6, 282) = 427.59, p < .001$]. A significant main effect also emerged for gender [$F(6, 282) = 17.15, p < .001$]. As shown in Table 1, girls reported spending significantly more time talking on the phone than boys [$F(1, 287) = 15.76,$

$p < .001$]. In contrast, boys reported spending significantly more time playing video games than girls [$F(1, 287) = 63.24, p < .001$]. A trend also emerged for e-mailing/IMing [$F(1, 287) = 3.88, p = .05$], with girls reporting that they spent more time e-mailing/IMing than boys (see Table 1).

The Effects of Parental Alcoholism and Gender on Adolescent Psychological Adjustment

Two-Way Factorial ANOVA models were conducted to examine the effects of parental alcoholism and gender on anxiety and depression, respectively. The anxiety model was significant [$F(3, 322) = 6.77, p = .001$]. In addition, the main effect for parental alcoholism was significant [$F(1, 322) = 4.24, p < .05$]. As shown in Table 1, adolescents with an alcoholic parent reported higher levels of anxiety than those without an alcoholic parent. The main effect for gender also was significant [$F(1, 322) = 8.24, p < .01$], with girls reporting higher levels of anxiety than boys. The depression model was not significant [$F(3, 325) = 1.03, p = .38$].

The Moderating Effects of Media Use on the Relationship Between Parental Alcoholism and Adolescent Psychological Adjustment

Subsequent Factorial ANOVA models were conducted to examine the interactions between parental alcoholism and the use of specific types of media to explore whether media use moderates the relationships between parental alcoholism and adolescent anxiety and between parental alcoholism and adolescent depression. Prior to these analyses, the media use measures were dichotomized using median splits. Separate models were conducted for each measure of media use. In each model, the design factors were parental alcoholism, gender, and a media use

measure. The dependent variables were anxiety and depression. Cross-sectional analyses (all variables assessed at Time 1) and longitudinal analyses (the dependent variables assessed at Time 2) were conducted.

Television Viewing

Cross-Sectional Models

The overall effect for the anxiety model was significant [$F(7, 288) = 3.04, p < .01$]. The results for the main effects for parental alcoholism and gender across models were similar to those just reported in the prior section. Therefore, details regarding these main effects will not be repeated here or in the sections that follow.

The main effect for television viewing was not significant. However, a significant two-way interaction was found between gender and television viewing [$F(1, 288) = 4.96, p < .05$], indicating that girls who had high levels of television viewing (three or more hours a day) reported the highest level of anxiety, whereas boys who had high levels of television viewing reported the lowest level of anxiety (see Fig. 1). In contrast to the anxiety model, the model examining depression was not significant.

Longitudinal Models

The longitudinal anxiety model was not significant. However, the depression model was significant [$F(7, 162) = 2.77, p < .05$]. Similar to the cross-sectional model for anxiety, a significant two-way interaction was found between gender and television viewing [$F(1, 162) = 7.08, p < .01$], indicating that girls who had high levels of television viewing (three or more hours a day) reported the highest level of depression, whereas boys who had high levels of television viewing reported the lowest level of depression (see Fig. 2).

Table 1 Main effects of parental alcoholism and gender on media use and psychological problems

	Parental alcoholism		Gender		Scale range
	No	Yes	Boys	Girls	
Media use					
Watching TV	4.20 (.09)	4.04 (.17)	4.10 (.15)	4.13 (.13)	1–6
Talking on the phone	3.28 (.10)	3.46 (.20)	2.93 (.17)	3.81 (.15)***	1–6
Playing video games	2.58 (.09)	2.59 (.18)	3.37 (.15)	1.80 (.13)***	1–6
E-mailing or IMing	2.77 (.11)	2.57 (.21)	2.44 (.18)	2.91 (.16) [†]	1–6
Text messaging	2.14 (.10)	2.07 (.19)	1.92 (.17)	2.28 (.14)	1–6
Surfing the Web	3.21 (.11)	3.08 (.21)	3.05 (.18)	3.24 (.15)	1–6
Psychological problems					
Anxiety	19.56 (.75)	22.90 (1.44)*	18.90 (1.24)	23.56 (1.05)**	0–82
Depression	37.29 (.75)	39.17 (1.44)	37.34 (1.24)	39.12 (1.04)	20–80

Means (and standard errors) are presented. [†] $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$

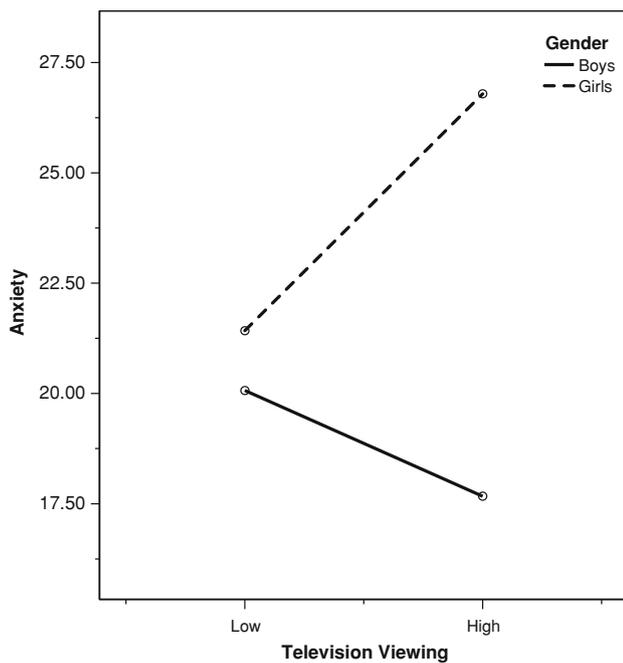


Fig. 1 Anxiety scores by gender and time spent watching television

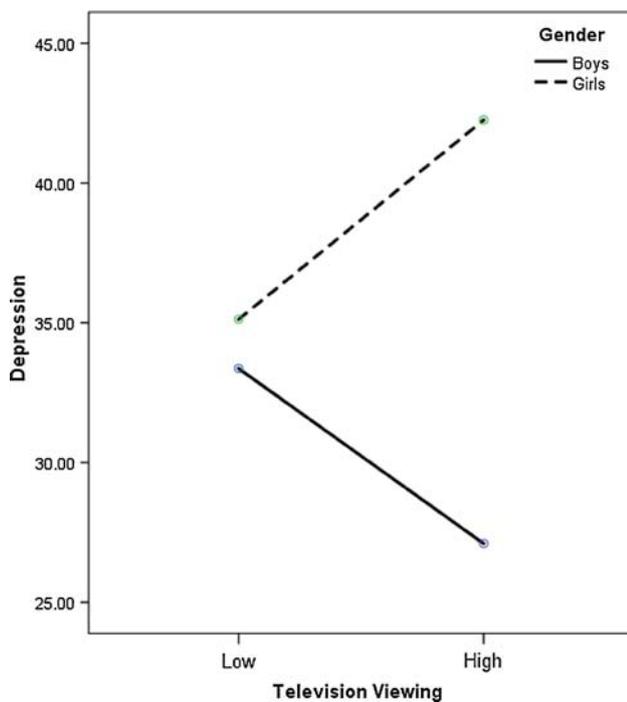


Fig. 2 Depression scores by gender and time spent watching television

Talking on the Telephone

Cross-Sectional Models

The overall effect for the anxiety model was significant [$F(7, 287) = 2.63, p < .05$]. The main effect for talking on

the telephone on adolescent anxiety was not significant. None of the interactions between parental alcoholism, gender, and talking on the phone were significant. The depression model also was not significant.

Longitudinal Models

The longitudinal anxiety and depression models were not significant.

Playing Video Games

Cross-Sectional Models

The overall effect for the anxiety model was significant [$F(7, 286) = 3.86, p < .001$]. A significant main effect was not observed for playing video games. However, a significant two-way interaction was found between gender and playing video games [$F(1, 286) = 10.39, p < .01$]. As illustrated in Fig. 3, girls who had high levels of video game playing (an hour or more a day) reported the highest levels of anxiety, whereas boys who had high levels of video game playing reported the lowest levels of anxiety.

A significant three-way interaction between parental alcoholism, gender, and playing video games also was found [$F(1, 286) = 6.52, p < .05$] (see Fig. 4a, b). Within the subgroup of adolescents who had an alcoholic parent, girls who had high levels of video game playing had the highest levels of anxiety, whereas boys who had high levels

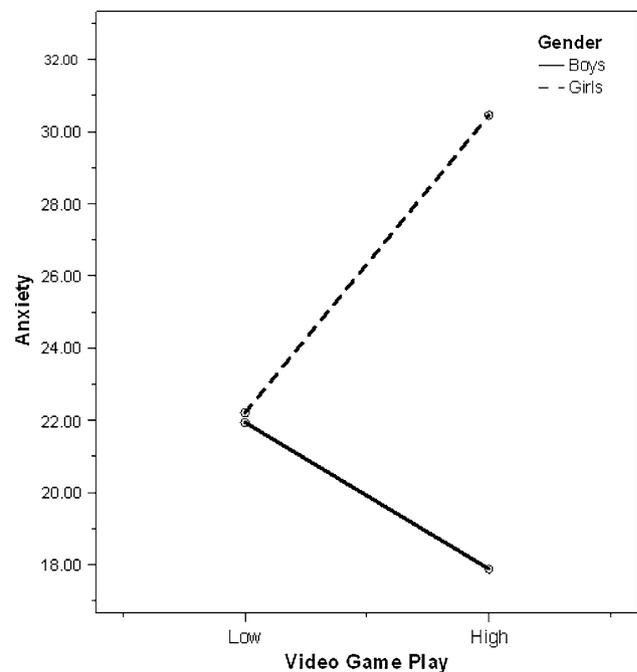


Fig. 3 Anxiety scores by gender and time spent playing video games

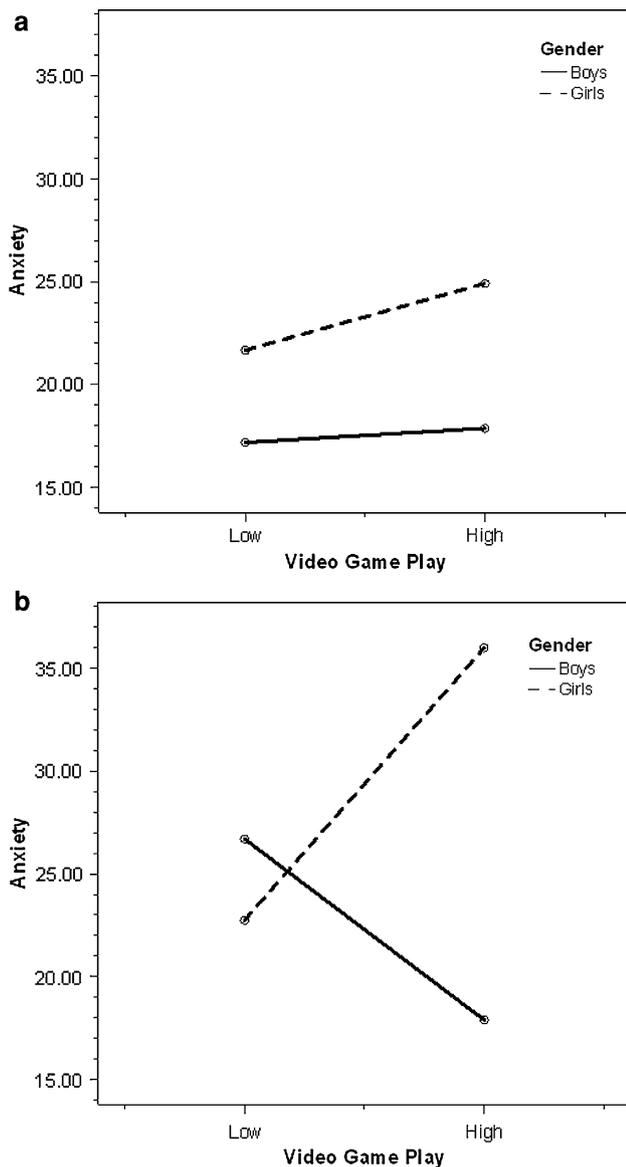


Fig. 4 **a** Anxiety scores by gender and time spent playing video games for adolescents without an alcoholic parent. **b** Anxiety scores by gender and time spent playing video games for adolescents with an alcoholic parent

of video game playing had the lowest levels of anxiety. The depression model was not significant.

Longitudinal Models

The longitudinal anxiety model also was significant [$F(7, 155) = 2.08, p < .05$]. Similar to the cross-sectional model, a significant two-way interaction was found between gender and playing video games [$F(1, 155) = 5.36, p < .05$]. Consistent with the cross-sectional results, girls who had high levels of video game playing (an hour or more a day) reported the highest anxiety level, whereas boys who had high levels of video game playing reported the lowest

anxiety level. The longitudinal depression model was not significant.

E-mailing/IMing, and Text Messaging

Cross-Sectional Models

The cross-sectional anxiety models were significant [$F(7, 286) = 2.18, p < .05$; $F(7, 287) = 2.26, p < .05$ for e-mailing/IMing and text messaging, respectively]. However, the main effects for e-mailing/IMing and text messaging and the interactions were not significant. The depression models also were not significant.

Longitudinal Models

The longitudinal anxiety and depression models were not significant.

“Surfing the Web/Internet”

Cross-Sectional Models

The cross-sectional anxiety model was significant [$F(7, 286) = 3.02, p < .01$]. A significant main effect for surfing the Web was not found. However, a two-way interaction was observed between parental alcoholism and “surfing the web” [$F(1, 286) = 4.64, p < .05$], indicating that adolescents who had an alcoholic parent and who had high levels of web surfing (two or more hours a day) had the highest anxiety level. The depression model was not significant.

Longitudinal Models

The longitudinal anxiety model also was significant [$F(7, 154) = 2.13, p < .05$]. A significant main effect for surfing the Web was found [$F(7, 154) = 6.02, p < .05$], suggesting that adolescents who spent a lot of time surfing the Web (two or more hours a day) were more anxious than those who spent less time surfing the Web. In addition, consistent with the cross-sectional results, a two-way interaction was found between parental alcoholism and surfing the Web [$F(1, 154) = 4.09, p < .05$], again suggesting that adolescents who had an alcoholic parent and who had high levels of web surfing had the highest anxiety levels. The depression model was not significant.

Discussion

Consistent with the literature (Gross et al. 2002; Marshall et al. 2006), adolescents reported spending approximately

2 hour a day watching television, one and one half hours a day talking on the phone, 1 hour a day “surfing the Web”, almost 1 hour a day e-mailing/IMing, and less than 1 hour a day playing video games. As noted previously, prior research has not examined the frequency of text messaging among adolescents. In the present study, adolescents reported spending less than 1 hour a day text messaging. It is interesting that in light of all of the new types of media available to adolescents today, the one that has been around the longest, television, is still the one used most frequently by adolescents.

None of these prevalence rates were found to differ by parental alcoholism. However, gender differences were observed. In accordance with the literature (Durkin and Barber 2002; Gentile et al. 2004; Marshall et al. 2006), boys reported spending more time playing video games than girls. In contrast, girls reported spending more time talking on the phone than boys. Hunley et al. (2005) also found girls to spend more time talking on the phone than boys. However, Gross et al. (2002) did not observe gender differences in the frequency of talking on the phone in their sample. This discrepancy may be due to age differences in the samples. The adolescents in Hunley et al.’s study (10th grade students) and the present study (9th and 10th grades students) were older than those in Gross et al.’s study (7th grade students). Consistent with the gender difference in phone use in the current study, a trend also indicated that girls had a tendency to e-mail and IM more than boys. These findings are not surprising given that adolescent girls tend to have more intimate relationships with their peers in comparison to adolescent boys (Collins and Steinberg 2006; Ruble et al. 2006).

In the present study, gender differences were not observed for time spent “surfing the Web.” As noted previously, Subrahmanyam et al. (2001) found that boys were heavier users of the Internet in comparison to girls during adolescence. In contrast, Gross (2004) and Hunley et al. (2005) did not find gender differences in Internet use. Again, this discrepancy in findings may be due to differing sample characteristics. It is important to note that the participants in the Subrahmanyam study ranged in age from 10 to 19 years, whereas the age range in the Gross (7th and 10th grade students) and the Hunley et al. (10th grade students) studies was much more narrow, focusing on early-middle adolescents. Findings from the present study, which examined 9th and 10th grade students, provide further support that Internet use does not differ by gender during middle adolescence.

Gender differences also were not found for television viewing in the present study. At first pass, these results appear to conflict with those that emerged from a meta-analysis conducted by Marshall et al. in 2006. The Marshall et al. analysis included 90 studies published in

English language journals between 1949 and 2004. In their analysis, boys were found to be more likely than girls to be high end viewers, watching four or more hours of television a day. However, no gender differences were observed for low frequency users (the majority of adolescents). It also should be noted that the meta-analysis included children and adolescents, whereas the current study only included middle adolescents.

Although the literature focusing on media use and adolescent adjustment has been growing, few studies have examined whether media use is related to adolescent psychological adjustment. Moreover, the handful of studies that have examined psychological adjustment have yielded mixed results. For example, Kraut et al. (1998) found significant associations between Internet use and psychological adjustment in their sample of 10–19 year olds, whereas Gross and colleagues (2002) did not observe significant associations between Internet use and psychological well being in their sample of 7th graders. It should be noted that both of these studies were somewhat limited. Both studies included small, non-representative samples (e.g., the Gross et al. sample was drawn from a middle-upper class community and the Kraut et al. sample only included adolescents who had Internet access). Moreover, both studies focused on the Internet. The present study extended these studies by examining the relations between a variety of different types of media and psychological adjustment in a large diverse group of adolescents.

In the present study, the pattern of associations between media use and adolescent psychological adjustment was strikingly consistent. The only significant main effect that was observed was for surfing the Web at Time 2, which suggested that adolescents who spent a lot of time surfing the Web (two or more hours a day) were more anxious than those who spent less time surfing the Web. None of the other types of media examined (frequency of television viewing, talking on the phone, e-mailing/IMing, text messaging, or playing video games) were related to depression or to anxiety. Moreover, results from the present study suggest that the use of media may potentially be beneficial for adolescents’ psychological health, particularly for boys. More specifically, the pattern of relations involving the interaction between gender and media use that emerged suggests that media use may actually serve as a protective factor for boys. For example, the interaction between gender and television viewing indicated that boys who watched the most television (three or more hours a day) reported the lowest anxiety levels (at Time 1) and the lowest levels of depression (at Time 2), whereas girls who watched the most television (three or more hours a day) reported the highest levels of anxiety and depression. The same pattern was found for playing video games. Again, boys who spent more time playing video games (an hour or

more a day) reported the lowest anxiety levels (at both Time 1 and Time 2), whereas girls who spent more time playing video games reported the highest anxiety levels. Strikingly, these results were consistent across different types of technology and across time. Taken together, these results indicate that spending time watching television or playing video games may have beneficial effects for boys, but harmful effects for girls.

Results examining the potential moderating effects of media use on the relationship between parental alcoholism and adolescent psychological adjustment provide further support for this hypothesis. As noted previously, a significant interaction was observed between parental alcoholism, gender, and playing video games. Consistent with the pattern of relations just discussed, within the subgroup of adolescents who had an alcoholic parent, boys who spent more time playing video games (an hour or more a day) had the lowest anxiety levels, whereas girls who spent more time playing video games had the highest anxiety levels. Again, playing video games appeared to serve as a protective factor for boys, but not for girls.

The protective effects of watching television and playing video games were particularly striking for boys. These results conflict with the majority of research conducted to date which has emphasized the potentially harmful effects of media use on adolescents. Results from this study indicate that it is important to also consider potential positive effects of media use during adolescence. Nevertheless, it is noteworthy that playing video games did not provide a protective effect for girls. Perhaps the gender difference is related to the specific types of video games played by boys and girls. It may be that boys are more likely than girls to play games that require them to become immersed in the game, allowing them to easily mentally disengage from their problems (e.g., fantasy type games). Another plausible explanation for the gender difference in results relating to video game play may relate to differences in family relationships. Research has shown that adolescent girls are more enmeshed in the family than are boys and that they are more likely to be affected by family problems because they have more difficulty separating themselves from the problems of others close to them (Gore et al. 1993). Therefore, it may simply be more difficult for girls to become disengaged from family problems that surround them than it is for boys.

Importantly, the longitudinal analyses validated the cross-sectional analyses. That is, the same pattern of results emerged in both the cross-sectional and longitudinal data. However, relatively fewer of the effects were significant when the longitudinal data were analyzed. This is likely due to the difference in sample size. The longitudinal sample was much smaller than the cross-sectional sample and therefore the longitudinal sample had less power to detect

significant effects. Nevertheless, the longitudinal analyses contribute important information. More specifically, they indicate that the pattern of relations is quite consistent and stable over time and they also provide some evidence that media use predicts later psychological adjustment.

Clearly, future research needs to explore the underlying mechanisms involved in the relationship between media use (particularly video game playing and television viewing) and adolescent psychological adjustment. It also would be important for future investigations to examine the potential protective effects of media use in adolescents from other types of dysfunctional family environments (e.g., adolescents from abusive homes, adolescents with a depressed parent). Similarly, other outcome measures should be examined to explore whether the pattern of relations observed in this study extends to other psychological problems during adolescence (e.g., delinquency, substance abuse). Positive outcomes (e.g., self-worth, academic performance) also need to be assessed. In addition, it would be imperative to examine the relations between media use and psychological adjustment in other age groups. Perhaps, media use acts as a protective factor more for older adolescents who are more autonomous from their parents than for younger adolescents (e.g., those in middle school). It also would be informative for future research to focus on psychosocial problems in adolescents who are extremely high end users of media (e.g., those who may be “addicted” to playing video games or to other types of media). It is important to note that the present study was limited because it relied on self-report data. Future research should validate the findings from this study with other types of methodology (e.g., parental report). Finally, it should be noted that the sample only included 14- to 16-year-old adolescents from the Mid-Atlantic United States. Therefore, caution should be taken in regard to generalizing the findings.

In sum, the present study extends the current literature by examining the associations between various types of media and adolescent psychological adjustment over time, in a large, diverse sample of adolescents. In addition, the present investigation uniquely contributes to the extant literature by exploring the potential moderating/“protective” effects of media use in adolescents at risk for psychological problems. Results from the present study are important because they indicate that the use of most media is not directly related to psychological problems during middle adolescence. Moreover, the findings suggest that the use of media actually may be beneficial for boys. These findings are particularly encouraging given how entwined media is becoming in the lives of adolescents. As further advances in technology are made, it will be fascinating to explore how new types of media will impact the development of adolescents. Although there is the frightening

possibility that advances in technology may alienate adolescents more by allowing them to live their lives through an interactive gadget (e.g., the iPhone), the new wave of media also holds hope for positively affecting adolescents. For example, Nintendo's new interactive Wii system requires active physical participation (e.g., moving and swinging a virtual racquet while playing tennis). In contrast to past video game systems, it actually encourages physical activity. In addition, the Wii system consists of primarily family-friendly games that are designed for more than one player. This new system may even promote social skills, cooperation, and communication by requiring adolescents to interact with peers and family members as they play. It is hoped that advances in other types of media will follow suit and hold the promise of positively impacting adolescent development.

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