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Violent Media in Childhood and Seriously Violent Behavior in Adolescence and Young Adulthood

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Abstract

Purpose: To quantify the relative odds of self-reported seriously violent behavior in adolescence and young adulthood given one's self-reported violent media diet in childhood.

Methods: Baseline data were collected nationally online from 1,586 youth 10–15 years of age in 2006. Follow-up data were collected in 2010–2011 and 2016. Children reported the amount of music, video games, television, websites with real people, and cartoons that depicted “physical fighting, hurting, shooting, or killing.” Seriously violent behavior was assessed 5 and 10 years later.

Results: 887 adolescents completed the survey at baseline and 5-year follow-up. The relative odds of reporting seriously violent behavior over time were 2.45-fold higher ($P < .001$) with each incremental increase in one's baseline violent media diet. After adjusting for other potentially influential characteristics, results persisted (aOR = 1.70, $P = .01$). The relative odds also were elevated for those frequently exposed to violence in music (aOR = 3.28, $p = 0.03$), television (aOR = 3.51, $p < 0.001$), and video games (aOR = 3.27, $p = 0.02$). 760 young adults completed measures at baseline and 10-year follow-up. The relative odds of seriously violent behavior increased 2.18-fold ($P = .001$) with each incremental increase in one's baseline violent media diet. After adjusting for other factors, the association persisted (aOR = 1.72, $P = .03$). Frequent exposure to violence in video games (aOR = 3.28, $p = 0.03$) and television (aOR = 3.14, $p = 0.02$) also were implicated.

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Conflict of interest disclosure:

The authors have no conflicts of interest to declare.

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Discussion: Exposure to violent media in childhood may be one modifiable influence on seriously violent behavior in adolescence and adulthood, even for those who have other risk factors.

Keywords

Children; Violent media; Seriously violent behavior; Technology

Youth violence is a significant public health issue that negatively affects individuals, families, and communities.^{1,2} Estimated costs associated with youth violence in the United States is more than \$20 billion annually.³ Although juvenile arrests in 2019 were down 58% since 2010,⁴ youth nonetheless account for a sizable proportion of perpetrators: 9% of all violent crimes were committed by juveniles, and 21% by 18–24-year-olds.⁵

No single risk factor causes violent behavior. Instead, an accumulation of exposures increases one's risk at each level of the social ecology (e.g., exposure to spousal abuse).^{2,6–9} Because it could easily be modified, exposure to violent media has been researched for decades as a potential contributor to aggressive behavior. Cross-sectional and laboratory research frequently document linkages.^{10–12} Studies that measure violent behaviors report similar effect sizes to those that measure aggression.¹⁰ Although fewer in number, longitudinal studies also report linkages: Huesmann and Eron found that adult criminal and violent behavior was associated with exposure to television violence 15 years prior.¹³ Findings were replicated in a Finnish sample.¹⁴ Further, Anderson and colleagues found that frequent violent video game play predicted physical aggression three to six months later for children and adolescents in three separate cohorts, two from Japan and one from the United States.¹⁵ Some exceptions are noted.¹⁶ Coyne and colleagues looked at longer term associations between externalizing behavior and violent video game play and did not find a linkage over the 5-year observation period.¹⁷ This may be because the measure reflecting externalizing behavior included items that did not meet the definition of aggression.

Youth media use is nearly ubiquitous¹⁸: Music is by far the most widely used medium in adolescence: 82% listen to music daily.¹⁹ Most – 83% of adolescent girls and 97% of boys 13–17 years of age – also play video games; 95% own or have access to a smartphone, and 85% say they go online and exchange content.²⁰ Cross-sectional research by Ybarra and colleagues suggests that one's general media violence diet may explain the increased odds of engaging in seriously violent behavior.²¹ As such, it is important not just to examine the association that specific media may have but also the association that one's violent media 'diet' across media may have with violent behavior over time.

The current study aims to fill noted research gaps. First, while extant research examines exposure to violence on television and in video games, exposures through other media, such as music, are less well studied yet constitute a large part of youth media diets. Second, much of the literature focuses on aggressive rather than violent behavior. Aggression is any behavior enacted by someone who intends to harm the other person when the other person does not want to be harmed.^{22,23} Violence is a more severe type of aggression that carries with it the possibility of serious physical harm to the other individual. All violent behaviors are aggressive, whereas not all aggressive behaviors are violent. Third, few studies examine

these linkages longitudinally, particularly between 5 and 10 years postexposure. Based on previous literature, we posit that violent media will predict violent behavior over time and that this will be particularly true for a general media diet as it reflects an accumulation of exposures.

Methods

Growing up with Media is a longitudinal study designed to study the association between violent media exposure in childhood and adolescence - particularly exposures to new media, including the Internet and seriously violent behavior. The survey protocol was reviewed and approved by the Centers for Disease Control and Prevention Institutional Review Board (IRB) for Waves 1–3 and by Chesapeake IRB for Waves 4–7 (subsequently acquired by Advarra IRB). Parents provided informed consent for their participation and permission for their child’s participation, and youth provided informed assent by reading the assent information and then clicking either “Yes, I want to take the survey” or “No, I do not want to take the survey.”

Sample

In 2006, 1,586 child-caregiver pairs were recruited through an email sent to randomly identified adult Harris Poll OnLine (HPOL) panel members who reported having a child living in their household. HPOL was the largest online panel at the time of recruitment, including four million members. Members were recruited through online advertising, advertising at conferences and events, and referrals.

Eligible adult caregivers reported having a child 10–15 years of age living in the household, speaking English, and being equally or more knowledgeable than other adults living in the household about their youth’s daily activities. Eligible youth participants were 10–15-year-olds who read English, lived in the household at least 50% of the time, and had used the Internet at least once in the last six months. Recruitment was balanced on youth age and sex; once a demographic ‘bin’ was filled (e.g., for 10–12-year-old girls), subsequent youth who met those criteria were marked ineligible.

Measures

Seriously violent behavior.—Seriously violent behavior, as defined by the US Department of Justice,²⁴ includes murder, aggravated assault, robbery, and sexual violence. Youth were coded as having engaged in past-year seriously violent behavior if they endorsed any of the following five behaviors: (1) behaviors that would likely result in murder (i.e., stabbing or shooting someone); (2) aggravated assault (i.e., threatening someone with a weapon; attacking someone resulting in the need for medical care); (3) robbery (i.e., using a knife or gun or some other kind of weapon like a bat to get something from someone else); and (4) sexual assault (kissing, touching, or doing anything sexual with another person when it was not wanted by that person). This last item was written to be developmentally appropriate for 10–15-year-olds. Because it may include behaviors that extend beyond rape, a sensitivity analysis was conducted to examine the results when this measure of sexual assault was excluded.

Exposure to violent media.—Youth reported the amount of violence they were exposed to across five different types of media: Television, computer and video games, music, websites of real people, and websites of cartoons. A similar question format was used for each medium: “When you [engage with media type], how many of them [show/talk about] physical fighting, hurting, shooting, or killing?”²⁵ Response options were captured on a four-point Likert scale [1 (almost none/none of them) – 4 (almost all / all of them)].

To reflect a general violent media diet, a factor score that included all five media, was estimated using maximum likelihood [Eigenvalue = 1.69, factor loadings ranged from .47 - .69, $\alpha = 0.70$, Kaiser-Meyer-Olkin ranges from 0.71 – 0.78].

For specific mediums, a categorical measure was created based upon data distributions to reflect those who reported that: (1) none/almost none, (2) some, or (3) many or almost all/all of each of the medium they consumed depicted violence. Because of low cell stability, for all longitudinal analyses, baseline exposure to violence on television was dichotomized to compare none/almost none or some versus many or almost all/all; baseline exposures to real people engaging in violence online was dichotomized to none/almost none versus some, many, almost all/all. Wave 7 longitudinal analyses included a measure of baseline exposures to cartoons engaging in violence online dichotomized to none/almost none versus some, many, almost all/all.

Background variables.—Youth age and sex were reported by caregivers; race and ethnicity were reported by youth. At the individual level, because trait anger can be increased by media violence²⁶, we include youths’ self-reported baseline propensity to respond with anger, measured by the 10-item State-Trait Anger Expression Inventory (STAXI-CA) T-Anger scale ($\alpha = 0.86$).²⁷ At the peer level, baseline exposure to externalizing peers was measured by asking youth the number of close friends they had who “have been arrested or done things that could get them in trouble with the police.”²⁸ At the family level, youth were asked if: “Ever, in real life, have you seen one of your parents get hit, slapped, punched, or beat up by your other parent, or their boyfriend or girlfriend?”²⁹

Procedures

Randomly identified adults were emailed a link to a brief online survey that assessed their eligibility. Ineligible adults were thanked for their participation; eligible adults were invited to complete a longer 5-minute survey after obtaining informed consent. They then forwarded their survey link to their child, who provided assent and completed the, on average, 21-minute survey. Youth were encouraged to return to the survey later if they were not in a space where their responses could be kept private from others, including their caregiver.

Data were collected online in 2006 (Wave 1), 2007–2008 (Wave 2), 2008 (Wave 3), 2010–2011 (Wave 4), 2011–2012 (Wave 5), 2012–2013 (Wave 6), and 2016 (Wave 7). In this paper, we examine data from baseline (Wave 1) and five years later (Wave 4, $n=887$); and baseline and 10 years later (Wave 7, $n=779$). Incentives were \$10 in Wave 1 and increased to \$40 in Wave 7. The Wave 1 survey response rate (31%) is consistent with well-conducted

surveys using online panels at the time of baseline recruitment. The response rate at Wave 4 was 56% (i.e., 887/1586), and at Wave 7, 49% (i.e., 779/1586).

As the recruitment target, data were weighted statistically to reflect the population of adults with children ages 10 to 15 years old in the United States according to adult age, sex, race/ethnicity, region, education, household income, and child age and sex. Using data collected from random digit dial samples, propensity score weighting also was applied to adjust for adult respondents' propensity to be online. The weight also adjusted for nonresponse across waves.

Plan of analysis

Rates of within-wave missingness were very low: Race (1.2%) had the highest rate of declination to answer. For all dichotomous variables, "decline to answer" was recoded as "symptom absent" (e.g., not having been in a physical fight). Those who declined to answer the question about race were coded as White, the majority race. For continuous variables, "decline to answer" was recoded to the cohort mean. As a sensitivity analysis, models also were estimated with missing data imputed. Youth who did not respond to Wave 4 or Wave 7, respectively, were excluded from that specific longitudinal analysis.

Analyses were conducted using Stata 15.³⁰ First, co-relations of violent exposure across media were explored using a correlation matrix and Cronbach's alpha, which reflects the inter-relatedness of the items. We also examined the percent of youth who reported varying patterns of exposure across media types. Next, to understand the long-term association between media violence and later violent behavior, we first estimated direct, unadjusted logistic regression odds (Model 1). We then estimated logistic regression odds that adjusted for baseline levels of seriously violent behavior, one's propensity to respond to stimuli with anger, exposure to externalizing peers, exposure to caregiver spousal abuse, sex, age, race, ethnicity, and self-reported dishonesty in answering survey questions (Model 2). For each time point, six unadjusted and adjusted models were estimated: One for violent media diet and five for each of the specific types of violent media of interest.

Results

On average, youth were 12.6 years of age (SE: 0.05) at baseline, 16.7 years of age (SE: 0.07) at 5-year and 22.1 years of age (SE: 0.07) at 10-year follow-up. As shown in Table 1, those who completed Waves 4 and 7, respectively, versus those who did not, respectively, generally had similar baseline demographic characteristics; exposure to externalizing peers was of exception.

Co-relation of violence exposure across media

The five indicators of exposure to violence in specific media were interrelated: Cronbach's alpha, Wave 1 = 0.70 (unweighted data given the computation ability of Stata). As shown in Supplemental Table 1, all media were significantly interrelated. The strongest correlations were noted for violence exposure in television and video games (0.46), and television and music (0.44). Although still significantly interrelated, violence exposure in video games and websites with real people was the least correlated (0.22).

As shown in Figure 1, more than half (56%) of youth said that none of the media they consumed was mostly violent (i.e., many, almost all, or all of it depicted physical violence).

Relative odds of seriously violent behavior five years after exposure to youth's general violent media diet

A factor score was estimated to reflect one's "violent media diet," that is, the intensity within and across youth exposures to violent content in five mediums. As shown in Table 2 and Supplemental Figure 1, the relative odds of reporting seriously violent behavior five years later were 2.45-fold higher ($p<0.001$) with each incremental increase in one's baseline violent media diet. After adjusting for other potentially influential characteristics, the relative odds of seriously violent behavior five years later rose 1.70-fold ($p=0.01$) with each incremental increase in one's violent media diet at baseline.

Specific types of media also were implicated: Frequent childhood exposure to violence in television (OR = 4.44, $p<0.001$), music (OR = 5.91, $p<0.001$), video games (OR=6.73, $p<0.001$), websites with real people (OR = 2.39, $p=0.03$) and websites with cartoons (OR = 3.35, $p=0.03$) each was associated with significantly elevated odds of seriously violent behavior in adolescence. Findings persisted for music (aOR = 3.28, $p=0.03$), television (aOR = 3.51, $p<0.001$) and video games (aOR = 3.27, $p=0.02$) even after adjusting for other childhood influences on violent behavior. Importantly, too, "some" exposure in childhood was associated with seriously violent behavior in adolescence for both music (aOR = 2.34, $p=0.05$) and video games (aOR = 2.72, $p=0.02$).

Longitudinal associations a decade later

As shown in Table 3 and Supplemental Figure 1, the relative odds of seriously violent behavior 10 years after one's exposure in childhood increased 2.18-fold ($p=0.001$) with each incremental increase in one's violent media diet. After adjusting for other factors, the association persisted (aOR = 1.72, $p=0.03$). As with adolescence, frequent childhood exposure to violence in music (OR = 4.48, $p=0.008$), television (OR = 4.26, $p=0.001$) and video games (OR = 5.38, $p=0.001$) each were associated with seriously violent behavior in adulthood. This longitudinal association persisted for video games (aOR = 3.28, $p=0.03$) and television (OR = 3.14, $p=0.02$) even after taking into account other potentially influential factors; violence depicted in music also was implicated (aOR = 2.85, $p=0.13$).

Contrary to other trends observed, exposure to violent websites that depicted cartoons at baseline was associated with lower odds of seriously violent behavior a decade later (aOR = 0.48, $p=0.09$). Given that this is in the opposite direction of other violent media exposures examined, it seems likely that this may be a statistical anomaly.

Findings were replicated when seriously violent behavior was defined without the measure of sexual assault (Supplemental Table 2), and when missing data were imputed (Supplemental Table 3).

Discussion

In this national, longitudinal study of children initially 10–15 years of age, findings suggest that exposure to violence in specific mediums and a general diet of violent media across media in childhood are associated with seriously violent behavior in adolescence and adulthood. Measured both in intensity and diversity of exposure, as one's violent media diet increases incrementally, so too do the odds of seriously violent behavior by 70%, over time. The increased odds are evident even after taking into account other factors that could explain violent behavior later in life, such as one's violent behaviors in childhood, exposure to caregiver spousal abuse, one's propensity to respond with anger, and association with peers who engage in activities that could get them in trouble with the police. Pediatricians should work with parents to identify a media consumption plan for their children that is realistic and associated with the least amount of violence as possible across the online, television, game, and music content they consume. Efforts to co-view content and talk with youth about what they are being exposed to in the media they are consuming also are likely useful.³¹

Youth do not experience media in a vacuum: Exposure to violence in one medium correlates highly with exposure in another medium. This saturation of messaging may be reinforcing the idea that violence is an appropriate and common tool to address situational anger across environments and stimuli. Understanding how individual types of media are affecting youth behavior is important. Current findings suggest that it may be equally important to understand how influences across media together are affecting behavior. Findings further suggest that early, intense exposure to violence in specific media, namely music, video games, and television, may be related to seriously violent behavior in adolescence and adulthood. There appears to be a stepwise association such that those who report “some” exposure in childhood are differentially at risk than those with more intense (i.e., many, almost all/all) exposures. This suggests that if parents are unable to eliminate their children's violent media exposure entirely, pediatricians could encourage them to reduce their exposure as much as possible, and that this may still have a positive impact.

Much of the research on exposure to violent media has focused on visual media, such as television, movies, and video games;^{17,32,33} or aggregated exposure across types.³⁴ Less is known about aural influences, like violent music, although studies exist: In one longitudinal study of adolescents, listening to aggression in music was associated with increased aggression one year later.³⁵ The current study builds upon this nascent research by noting associations at 5- and 10-years post-exposure, and suggests that more research attention could be focused on the content of the music to which adolescents are listening. Given the ease of digital download of music combined with the widespread ownership of smart phones among today's adolescents, this exposure may be more hidden and require additional effort by adults to co-experience and manage their children's consumption.

Limitations

Self-report is a less rigorous measure than objective measures of exposure to violent media. Given the length of the survey and the multitude of questions and topics queried however, it

seems unlikely that youth were able to determine the study hypotheses, thereby introducing demand characteristics. Additionally, youth report the intensity of exposure to, and not the amount of time spent with, violent media. For example, some youth who primarily play violent video games may do so for 2 hours a week, whereas others may do so for 40 hours a week. This may result in an underestimate of the association between exposure and behavior.³⁶

Although community-based research facilitates a wider view into youth behavior than other sources, such as juvenile justice data, self-report is vulnerable to misreporting, particularly of behaviors deemed undesirable. Efforts were made to increase the validity of self-report (e.g., surveying youth online vs in person or over the telephone, reminding them their answers were private, adjusting for self-reported dishonesty in answering survey questions). The inclusion of a social desirability scale might have facilitated a more direct examination of the prevalence and impact of misreporting in the data. That said, one in twenty youth (5%) reported at least one of the seriously violent behaviors queried at baseline. This is generally consistent with base rates observed in other large self-reported surveys,³⁷ suggesting that under-reporting may not have been an issue in the present study.

Additionally, the multivariate models may be over-adjusting for confounders and report artificially attenuated effect sizes.³⁸ For example, trait anger can be increased by media violence exposure,²⁶ and is therefore likely interrelated with media violence exposure. Including trait anger in the multi-variate model, therefore, partially controls for prior effects that this exposure has had on behavior. Also, controlling for prior violent behavior also essentially adjusts for prior predictors of violent behavior. Moreover, youth who consume high levels of media violence may be more likely to spend time with externalizing peers. If true, then the current models may underestimate the association between media violence and violent behavior given that youth who were associating with such peers at baseline were less likely to participate in subsequent waves.

Moreover, although the data are national, they may not be representative. Survey weights were applied to adjust for this possibility. The national reach nonetheless affords a broader view of youth experiences than might not have been observed in a local setting. Moreover, given the study's focus on mechanism, internal validity is more important than external validity. Finally, rates of attrition are suboptimal, although differential attrition generally was not apparent.

Implications

Since 2006, when baseline data were collected, technology has changed dramatically. A growing body of literature suggests that newer, peer-to-peer, and immersive technologies may positively affect health behavior change.^{39,40} It stands to reason that a similar learning effect could be observed if content encouraged unhealthy behaviors, including violence. The current study supports this hypothesis with older technology. Future research should both replicate the current study and examine whether newer technologies are associated with an enhanced learning effect.

Conclusion

During childhood, exposure to violence across a variety of media, operationalized as one's violent media "diet," appears to be related to engaging in seriously violent behavior in adolescence and adulthood, even beyond one's propensity to respond to situations with anger, having peers who are engaging in behaviors that could get them in trouble with the police, being exposed to caregiver spousal abuse, and engaging in violent behaviors as a child. Specific exposures to video games and television also appear to be associated with violent behavior over time; similar linkages are suggested for music. While findings should be replicated in other community-based samples, it seems reasonable to suggest that pediatricians might work with parents to identify a media consumption plan that minimizes children's exposure to violence across media types and is realistic within the family milieu.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Implications and Contribution

In this national, longitudinal study, exposure to violent media at 10–15 years-old was associated with increased odds of seriously violent behavior 5 and 10 years later, adjusting for aggression, externalizing peers, and caregiver spousal abuse. This was true for a general ‘violent media diet;’ and video games, television and music.

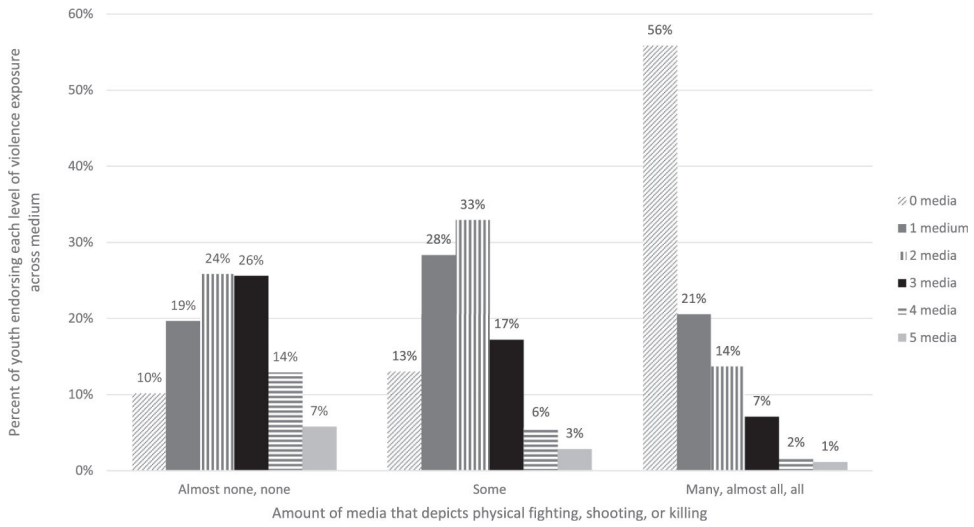


Figure 1. The percent of youth who reported a specific amount of exposure to physical fighting, shooting, or killing across media types for 10–15-year-olds in the United States (n = 1,586). Different colored bars denote the number of media to which a youth were exposed to a certain level of violence. Five media were aggregated: television, video games, music, websites with real people, and websites with cartoon figures.

Responses at Wave 1 (baseline) for completers and noncompleters of Wave 4 (5 years) and Wave 7 (10 years), respectively; weighted data

Youth characteristics at baseline	Baseline All youth n=1586		Cohort 5 years later		Cohort 10 years later		p-value	p-value		
			Non-Completer n=699		Non-Completer n=807				completer n=779	
		M(SE)	M(SE)	% (n)	M(SE)	% (n)			M(SE)	% (n)
Violent media diet (a factor score; M:SE)	0.02 (0.03)	.06 (.05)	-0.02 (0.04)	0.17	0.05 (0.04)	-0.02 (0.04)	0.26			
Amount of violence in TV shows consumed				0.03			0.36			
None / almost none or some	69.9% (1079)	66.1% (446)	72.8% (634)		68.5% (545)	71.4% (534)				
Many / almost all / all	30.1% (465)	33.9% (229)	27.2% (237)		31.5% (251)	28.6% (214)				
Amount of violence in music listened to				0.21			0.42			
None/almost none	43.1% (665)	43.4% (293)	42.8% (372)		41.1% (327)	45.2% (338)				
Some	43.0% (664)	40.6% (274)	44.9% (391)		44.0% (350)	42.0% (314)				
Many / almost all / all	14.0% (215)	16.1% (108)	12.3% (107)		15.0% (119)	12.9% (96)				
Amount of violence in games played				0.38			0.10			
None / almost none	35.2% (543)	33.0% (222)	36.9% (321)		31.8% (253)	38.7% (290)				
Some	39.8% (615)	42.2% (285)	37.9% (330)		42.1% (335)	37.4% (280)				
Many / almost all / all	25.0% (387)	24.8% (167)	25.2% (219)		26.1% (208)	23.9% (179)				
Amount of violence seen in websites that show real people				0.53			0.79			
None/almost none	85.3% (1317)	84.4% (569)	86.0% (748)		85.0% (677)	85.6% (641)				
Some / many / almost all / all	14.7% (227)	15.6% (105)	14.0% (122)		15.0% (120)	14.4% (108)				
Amount of violence seen in websites that show cartoons				0.68			0.56			
None / almost none	57.7% (891)	57.6% (388)	57.8% (503)		56.8% (452)	58.7% (439)				
Some	32.8% (507)	32.0% (216)	33.5% (291)		43.3% (344)	41.3% (309)				
Many / almost all / all*	9.5% (146)	10.4% (70)	8.7% (76)		5.5% (44)	4.1% (31)				
Any seriously violent behavior	4.8% (74)	4.7% (31)	4.9% (43)		18.8 (0.2)	18.7 (0.2)		0.32		
Propensity to respond to stimuli with anger (M:SE)	18.8 (0.2)	18.8 (0.2)	18.7 (0.2)	0.81	18.8 (0.2)	18.7 (0.2)	0.93			
Exposure to caregiver spousal abuse	9.0% (140)	10.8% (73)	7.7% (67)	0.12	10.9% (86)	7.1% (53)	0.06			
Externalizing peers	16.6% (257)	19.6% (132)	14.3% (125)	0.03	20.6% (164)	12.5% (93)	0.00			
Age (M:SE)	12.6 (0.05)	12.7 (0.1)	12.5 (0.1)	0.18	12.6 (0.07)	12.6 (0.08)	0.60			
Female	48.0% (741)	49.0% (330)	47.2% (411)	0.61	46.8 % (375)	49.2 % (368)	0.48			

Youth characteristics at baseline	Baseline All youth n=1586	Cohort 5 years later		Cohort 10 years later		p-value
		Non-Completer n=699	Completer n=887	Non-Completer n=807	Completer n=779	
Race						0.92
White	71.2% (1099)	71.6% (483)	70.9% (617)	71.6% (570)	70.8% (530)	
Black	12.5% (193)	10.8% (73)	13.9% (121)	11.8% (94)	13.2% (99)	
Mixed	8.1% (125)	8.7% (59)	7.7% (67)	8.5% (68)	7.7% (58)	
All other	8.2% (127)	9.0% (60)	7.6% (66)	8.1% (64)	8.3% (62)	
Hispanic ethnicity	17.5% (271)	17.6% (119)	17.5% (152)	16.7% (133)	18.4% (138)	0.55
Dishonesty in answering the questions	5.1% (78)	5.6% (38)	4.7% (40)	5.3% (43)	4.8% (36)	0.70

* This measure is dichotomized for longitudinal analyses at 10 years

The relative odds of seriously violent behavior 5 years after exposure to violence by media type and overall media diet, weighted data (n=887)

Table 2.

Exposure to media violence at baseline	Seriously violent behavior 5 years later					
	Did not report seriously violent behavior	Reported seriously violent behavior	Unadjusted logistic regression model	Adjusted logistic regression model	p-value	p-value
	% (n)	% (n)	OR (95% CI)	aOR (95% CI)		
Violent media diet (M:SE)	-0.07 (0.03)	0.60 (0.15)	2.45 (1.68, 3.59)	1.70 (1.13, 2.56)	<0.001	0.01
Amount of violence in <u>TV shows</u> consumed at baseline						
None / almost none or some	75.5% (606)	40.5% (27)	1.0 (RG)	1.0 (RG)		
Many / almost all / all	24.5% (197)	59.1% (39)	4.44 (2.17, 9.07)	3.51 (1.75, 7.05)	<0.001	<0.001
Amount of violence in <u>music</u> listened to at baseline						
None / almost none	44.9% (361)	16.9% (11)	1.0 (RG)	1.0 (RG)		
Some	43.8% (352)	58.0% (39)	3.52 (1.56, 7.91)	2.34 (0.99, 5.51)	0.002	0.05
Many / almost all / all	11.3% (90)	25.1% (17)	5.91 (2.32, 15.04)	3.28 (1.16, 9.23)	<0.001	0.03
Amount of violence in <u>video games</u> played at baseline						
None / almost none	39.0% (314)	10.9% (7)	1.0 (RG)	1.0 (RG)		
Some	37.4% (300)	44.6% (30)	4.27 (1.79, 10.18)	2.72 (1.14, 6.47)	0.001	0.02
Many / almost all / all	23.6% (190)	44.5% (30)	6.73 (2.81, 16.11)	3.27 (1.17, 9.12)	<0.001	0.02
Amount of violence seen in <u>websites that show real people</u> at baseline						
None/almost none	40.5% (27)	73.7% (49)	1.0 (RG)	1.0 (RG)		
Some / many / almost all / all	13.0% (105)	26.3% (18)	2.39 (1.11, 5.14)	1.19 (0.53, 2.67)	0.03	0.68
Amount of violence seen in <u>websites that show cartoons</u> at baseline						
None / almost none	59.3% (476)	27.0% (40)	1.0 (RG)	1.0 (RG)		
Some	32.8% (264)	41.4% (28)	<i>1.85 (0.88, 3.88)</i>	1.30 (0.56, 3.03)	<i>0.10</i>	0.54
Many / almost all / all	7.9% (64)	18.1% (12)	3.35 (1.11, 10.09)	1.46 (0.53, 4.05)	0.03	0.46

OR: Odds ratio; aOR: Adjusted odds ratio. Models are adjusted for youth age, sex, race, ethnicity; and baseline seriously violent behavior and exposure to caregiver spousal abuse, propensity to respond to stimuli with anger, externalizing peers, and self-reported honesty in answering survey questions. Bolded text denotes p<0.05; italicized text denotes p<0.20.

Table 3.

The relative odds of seriously violent behavior 10 years after exposure to violence by media type, weighted data (n=760)

Exposure to media violence at baseline	Seriously violent behavior 10 years later				Adjusted logistic regression model aOR (95% CI)	p-value
	Did not report seriously violent behavior % (n)	Reported seriously violent behavior % (n)	Unadjusted logistic regression model OR (95% CI)	p-value		
Violent media diet (M, SE)	-0.06 (0.04)	0.63 (0.28)	2.18 (1.40, 3.39)	0.001	1.72 (1.05, 2.81)	0.03
Amount of violence in TV shows consumed at baseline						
None / almost none or some	73.5% (516)	39.4% (18)	1.0 (RG)		1.0 (RG)	
Many / almost all / all	26.5% (186)	60.6% (28)	4.26 (1.76, 10.31)	0.001	3.14 (1.16, 8.52)	0.02
Amount of violence in music listened to at baseline						
None / almost none	46.4% (326)	26.2% (12)	1.0 (RG)		1.0 (RG)	
Some	41.9% (294)	44.1% (20)	1.87 (0.68, 5.10)	0.22	1.72 (0.63, 4.68)	0.29
Many / almost all / all	11.8% (83)	29.8% (14)	4.48 (1.49, 13.49)	0.008	2.85 (0.74, 11.00)	0.13
Amount of violence in video games played at baseline						
None / almost none	40.3% (283)	14.2% (6)	1.0 (RG)		1.0 (RG)	
Some	37.0% (260)	43.0% (20)	3.31 (1.15, 9.53)	0.03	2.37 (0.85, 6.62)	0.10
Many / almost all / all	22.7% (159)	42.8% (20)	5.38 (2.04, 14.24)	0.001	3.28 (1.15, 9.36)	0.03
Amount of violence seen in websites that show real people at baseline						
None/almost none	86.4% (607)	73.9% (34)	1.0 (RG)		1.0 (RG)	
Some / many / almost all / all	13.6% (96)	26.1% (12)	2.25 (0.79, 6.40)	0.13	1.43 (0.43, 4.79)	0.56
Amount of violence seen in websites that show cartoons at baseline						
None / almost none	58.4% (410)	63.8% (29)	1.0 (RG)		1.0 (RG)	
Some / many / almost all / all	41.6% (292)	36.2% (17)	0.80 (0.33, 1.91)	0.61	0.48 (0.21, 1.12)	0.09

RG: Reference group; OR: Odds ratio; aOR: Adjusted odds ratio. Models are adjusted for youth age, sex, race, ethnicity, baseline seriously violent behavior, concurrent propensity to respond to stimuli with anger and self-reported honesty in answering survey questions. Bolded text denotes p<0.05; italicized text denotes p<0.20.