Society of Medical Education & Research

2021, Volume 1, Page No: 50-60
ISSN: 3108-4826

Journal of Medical Sciences and Interdisciplinary Research

Longitudinal Links between Early Childhood Exposure to Violent Television and Later Externalizing Behaviors in Adolescent Boys and Girls

David Matthew Clark[1]*, Stephen Joel Turner[1]

[1]Department of Management, Leeds University Business School, University of Leeds, Leeds, United Kingdom.

***E-mail** ✉ d.m.clark.leeds@outlook.com

Abstract

Exposure to violent media during early childhood represents a modifiable risk factor for preventive interventions. While prior research has documented links between violent media exposure and aggressive tendencies in childhood, few studies have examined the enduring associations with antisocial behavior into adolescence. This study explores prospective links between early exposure to violent television and later antisocial outcomes in mid-adolescence. The sample comprised 963 girls and 982 boys from the Quebec Longitudinal Study of Child Development (QLSCD) birth cohort. Parents reported their child's frequency of viewing violent television at ages 3.5 and 4.5 years. At age 15, participants self-reported four indicators of antisocial behavior. Linear regression models assessed the relationship between early violent media exposure and adolescent antisocial outcomes, with analyses stratified by sex and controlling for pre-existing and concurrent individual and family confounders. Among boys, early childhood exposure to violent television was associated with higher levels of proactive aggression (β = 0.065; 95% CI, 0.001–0.089), physical aggression (β = 0.074; 95% CI, 0.040–0.487), and overall antisocial behavior (β = 0.076; 95% CI, 0.013–0.140) in mid-adolescence. No significant prospective associations were observed for girls. Findings indicate that early violent media exposure can have long-lasting adverse effects on boys' behavioral development, increasing risks for aggression and delinquent behavior over a decade later. Preventive strategies aimed at educating parents and communities about the potential harms of preschool exposure to violent content may foster healthier developmental trajectories in youth.

Keywords: Youth, Preschool development, Screen violence, Psycho-social risks, Aggression, Maladaptive development

Introduction

Children are frequently exposed, directly or indirectly, to overt and subtle forms of violence in media from an early age [1]. Evidence suggests that consuming violent content may produce both immediate and long-term detrimental effects on development [2-5]. With the increasing integration of technology in everyday life across multiple devices and contexts, isolating the specific impact of violent media has become more challenging [6]. Historical datasets, when television was the predominant medium, provide methodological advantages by reducing confounding from today's ubiquitous digital technology.

Violent media encompasses physical, verbal, and relational aggression and includes visual representations depicting intentional harm to others [7]. Young children are particularly drawn to stimulating, fast-paced violent content, often featuring appealing characters, such as superheroes, who engage in and are rewarded for aggressive behaviors, thereby increasing exposure likelihood [8].

Experimental designs exposing preschoolers to violent content are largely unfeasible due to ethical constraints. Therefore, non-experimental, correlational studies provide naturalistic insights into real-life exposure and its outcomes. These approaches allow researchers to ethically examine the long-term psychosocial consequences of violent media during early childhood.

Access this article online https://smerpub.com/

Received: 17 November 2020; **Accepted:** 12 January 2021

How to cite this article: Clark DM, Turner SJ. Longitudinal Links between Early Childhood Exposure to Violent Television and Later Externalizing Behaviors in Adolescent Boys and Girls. J Med Sci Interdiscip Res. 2021;1:50-60. https://doi.org/10.51847/FjrpsIu2ww

Some studies, such as Ferguson (2015), have reported null findings regarding the link between television violence and subsequent aggression [9]. However, failure to detect a significant effect does not confirm the absence of an effect; small, sex-specific, or context-dependent effects may exist, particularly influenced by individual susceptibility or familial and environmental factors [10, 11].

Conversely, multiple studies demonstrate enduring risks associated with early violent televiewing [1-9]. Early exposure correlates with elevated externalizing behaviors both in the short and long term. For instance, a longitudinal study of American children followed into their mid-twenties found that the top 20% most exposed exhibited significantly higher aggression 15 years later, with males showing more physical violence and females more indirect aggression [12]. Similarly, Robertson *et al.* (2013), using a New Zealand birth cohort (1972–1973), reported that childhood violent television exposure predicted increased antisocial traits and early adult criminal convictions, controlling for early behavioral problems, IQ, socioeconomic status, and parenting practices [13].

These associations are supported by theoretical frameworks. Bandura's observational learning theory posits that children acquire behaviors through model observation. In the classic Bobo doll experiment, children (mean age 4 years 4 months) imitated aggressive acts, especially when they identified with the aggressor and observed rewarded behavior [14]. Repeated exposure during early childhood may normalize aggressive conduct, particularly when media rarely depicts consequences and characters are rewarded for violence [8, 15, 16].

The General Aggression Model further emphasizes interactions among social, personal, and environmental factors in shaping aggression [17]. Early repeated exposure to antisocial behavior can alter children's social cognition, personality traits, and interpersonal relationships, contributing to aggressive scripts and beliefs [18-20]. Desensitization through habituation reduces emotional responses to violence, diminishes empathy, and can lower prosocial helping behaviors [21].

Despite these findings, longitudinal research on preschool violent media exposure remains limited. Most studies begin in middle childhood, missing critical early developmental periods essential for cognitive, emotional, and social maturation [22]. Early experiences profoundly influence later developmental trajectories, supporting the need for preventive interventions that optimize children's ability to function independently and adhere to social norms [23].

Additionally, prior research often treats sex merely as a covariate, neglecting established biological and social differences. Boys and girls encounter distinct socialization patterns and normative expectations, affecting media preferences and behavioral tendencies [24]. Boys tend to prefer fast-paced, action-oriented media and direct aggression, while girls gravitate toward relational and emotional content, exhibiting indirect aggression [25]. Thus, analyzing males and females separately allows for more accurate identification of sex-specific risk pathways [26].

The present study aims to clarify the long-term psychosocial impact of violent television exposure during preschool. Using a birth cohort of girls and boys, we examine prospective associations between exposure at ages 3.5 and 4.5 and self-reported antisocial behavior at age 15. Data were drawn from multiple sources, including parents, trained examiners, and participants themselves. We hypothesize that early violent televiewing will predict higher levels of antisocial behavior in mid-adolescence, independent of pre-existing and concurrent individual and family confounding factors.

Materials and Methods

Study sample

Data for this investigation came from a group of children born in Quebec who were part of the Quebec Longitudinal Study of Child Development (QLSCD), administered by the Institut de la Statistique du Québec. The QLSCD is designed to examine factors that shape social integration and educational outcomes among millennial-generation youth in Quebec, Canada (http://www.iamillbe.stat.gouv.qc.ca/default_an.htm, accessed on 12 December 2024). The project initially drew a stratified random sample of 2837 infants born during 1997–1998 from the province's birth registry. Following adjustments for eligibility and participation, 2223 families were enrolled, equaling 82% of the intended pool (93 cases were ineligible, 172 were unlocatable, 14 were not contactable, and 438 declined). The study unfolded across three periods: yearly data collection starting at 5 months of age until 2002 (1998–2002 phase), then twice-yearly during primary schooling (2003–2010 phase), and every two years from age 13

onward into early adulthood (2011–2015 phase). Parents provided consent at each collection point, while children gave their own assent starting in the school-age period. Analyses focused on 1945 preschool-aged participants (50.4% male) with complete records on violent television exposure at ages 3.5 or 4.5 years (2001–2002 data). Complete outcome measures at age 15 (2013) were present for 72.27% of these individuals.

Measures: predictor (violent televiewing at ages 3.5 and 4.5 years)

At the assessments when children were 3.5 and 4.5 years old, the adult best acquainted with the child (the mother in 98% of instances) indicated how frequently the child viewed programs or films featuring considerable violence, answering the item: "How frequently does the child view TV programs or films containing substantial violent content?". This measure was custom-developed for the QLSCD by the Institut de la Statistique du Québec. Responses were given on a four-option scale: 0 (never), 1 (rarely), 2 (sometimes), 3 (often). Each participant's score was computed as the mean across both time points.

Measures: outcomes (externalizing behavior at age 15 years)

When participants reached age 15, they self-reported on externalizing behaviors using the online Mental Health and Maladjustment in Adolescence questionnaire [27]. This tool assesses adolescent psychological health and investigates the impact of risk and protective elements from childhood through adolescence. Four indices were constructed by totaling responses on the respective items for each domain. All responses used a three-option scale: 0 (not at all true), 1 (somewhat true), 2 (very true), where higher sums denote increased externalizing issues [4, 6, 27].

Proactive aggression was evaluated with four statements: "Over the last year, I made threats of physical harm to obtain something desired / I physically struck someone who had not provoked me / I issued threats of violence to compel another to act against their wishes / I threatened physical harm as a means of theft". Scores ranged from 0 to 8 ($\alpha = 0.78$).

Reactive aggression was evaluated with three statements: "Over the last year, I struck someone who had accidentally caused me harm / I physically responded to someone who had issued threats toward me / If accidentally jostled, I struck the individual even without intent on their part". Scores ranged from 0 to 6 ($\alpha = 0.63$).

Physical aggression was evaluated with 17 statements: "Over the last year, I took part in group brawls / I made threats of physical harm to obtain something desired / I physically struck someone who had accidentally caused me harm / I physically responded to someone who had issued threats toward me / I spread malicious comments about others indirectly / I participated in online harassment (such as insults, threats, or intimidation) toward peers via internet or mobile / I used verbal insults or derogatory remarks toward others / I caused intentional injury requiring medical care / If accidentally jostled, I struck the individual even without intent on their part / I employed an object as a weapon during a confrontation / I assaulted someone unprovoked / I ridiculed or derided another person / I excluded someone from my social circle despite their interest / I entertained thoughts of causing severe harm / I issued threats of violence to compel another to act against their wishes / I threatened physical harm as a means of theft / I extorted possessions from another youth". Scores ranged from 0 to 32 ($\alpha = 0.88$).

Antisocial behavior was evaluated with five statements: "Over the last year, I faced judicial proceedings for misconduct / I was detained in a youth facility for misconduct / I received a conviction for misconduct / I experienced police arrest for misconduct / I was interrogated by authorities regarding suspected misconduct". Scores ranged from 0 to 10 ($\alpha = 0.67$).

Measures: individual and family control variables (between ages 5 months and 15 years)

Various early and concurrent individual and household attributes were incorporated as adjustments, selected based on prior theoretical frameworks and research evidence concerning the impact of violent media on adolescents. Indicators of potential risk were dichotomized as 1 (risk present) versus 0 (risk absent). Reports for most of these came from the primary informant familiar with the child.

Gender was documented at 5 months (coded 1 for male) via questions adapted from the Labour Force Survey [28]. Challenging temperament at 1.5 years (coded 1 if 1 standard deviation over the average) was evaluated using the Infant Characteristics Questionnaire [29] ($\alpha = 0.80$). Initial levels of physical aggressiveness at 1.5 years (coded 1 if 1 SD over average) and household exposure to physical aggressiveness at 3.5 years (coded 1 for any

presence) drew from instruments in the National Longitudinal Study on Children and Youth (NLSCY) [4, 6, 27] (α = 0.80). Cognitive-neural development at 2.5 years (coded 1 if 1 SD over average) involved direct child testing with the Object Placement Imitation task conducted by trained staff [30]. Aggregate screen exposure at age 15—encompassing computers, gaming consoles, and TV (coded 1 if 1 SD over average)—came from adolescent self-reports [6].

Symptoms of depression in mothers at 5 months (coded 1 if 1 SD over average) utilized the Center for Epidemiological Studies Depression Scale [31] (α = 0.81). Level of maternal schooling at 5 months (coded 1 for incomplete high school) was based on items from the General Social Survey on Work and Education [32]. History of antisocial conduct in parents at 5 months (coded 1 if 1 SD over average) employed the National Institute of Mental Health-Diagnostic Interview Schedule [33] (α = 0.62). Household dysfunction at 1.5 years (coded 1 if 1 SD over average) was assessed with the McMaster Family Assessment Device [34] (α = 0.84). Harsh or hostile maternal parenting observed at 1.5 years (coded 1 if 1 SD over average) was scored by observers via the Home Observation for Measurement of the Environment—Infant Version [21] (α = 0.77). Adequacy of family income at 3.5 years (coded 1 for inadequate) followed the Low-Income Measure (LIM) criteria from the Survey on Labor and Income Dynamics [35]. Household composition at age 15 (coded 1 for single-parent) originated from NLSCY components [28].

The QLSCD investigators chose these tools for their proven psychometric properties and suitability. Comprehensive details regarding the development, validation, and rationale for these instruments, questionnaires, and procedures are accessible at: https://www.jesuisjeserai.stat.gouv.qc.ca/, accessed on 20 December 2025.

Statistical procedures

Prospective links over an extended period were modeled via ordinary least squares regression analyses. A separate model was estimated for each of the four externalizing outcomes. The dependent variable (externalizing at age 15) was regressed on the level of violent TV viewing reported for ages 3.5–4.5 years. All models included adjustments for early and simultaneous individual and household factors likely to confound or mediate the primary association. The main predictor and all adjustments were entered together in each equation. Models were estimated independently for male and female participants.

Attrition and incomplete responses, common in long-term follow-ups, were handled through multiple imputation in SPSS version 26. Twenty imputed data sets were produced and combined to yield stable parameter estimates while incorporating variability from missing information.

Comparisons of cases with full versus partial data availability

Group differences in key characteristics between those with complete versus missing records were examined with chi-square tests. For males, participants with full data more often had mothers who graduated high school ($\chi^2(1, N = 979) = 5.587$, $p < 0.05$), mothers reporting fewer depressive symptoms ($\chi^2(1, N = 982) = 6.918$, $p < 0.01$), households with adequate financial resources ($\chi^2(1, N = 942) = 4.676$, $p < 0.05$), superior neurocognitive performance ($\chi^2(1, N = 982) = 5.990$, $p < 0.05$), and reduced overall screen exposure ($\chi^2(1, N = 982) = 50.669$, $p < 0.001$) relative to those with gaps. For females, complete cases more frequently involved income-adequate families ($\chi^2(1, N = 963) = 6.440$, $p < 0.05$), lower domestic aggressiveness exposure ($\chi^2(1, N = 963) = 4.852$, $p < 0.05$), intact two-parent homes ($\chi^2(1, N = 963) = 53.789$, $p < 0.001$), and lesser total screen time ($\chi^2(1, N = 963) = 41.559$, $p < 0.001$) compared to incomplete cases.

Results and Discussion

Summary statistics covering the main exposure, outcomes, and adjustments appear in **Table 1**. In the period spanning ages 3.5 to 4.5 years, the vast majority of female participants had zero exposure to media containing violence, while the bulk of male participants had encountered such material to differing degrees.

Table 1. Descriptive statistics for predictor, outcome, and control variables in girls and boys

Variable	Girls M (SD)	Girls Range	Girls Categorical Variables (%)	Boys M (SD)	Boys Range	Boys Categorical Variables (%)

Predictor (assessed at 3.5 and 4.5 years)					
Exposure to violent television content					
0 = No exposure			54.5		41.6
1 = Infrequent exposure			35.4		40.8
2 = Occasional exposure			8.7		14.6
3 = Frequent exposure			1.3		3.0
Outcomes (assessed at 15 years)					
Proactive aggression	0.20 (0.52)	0–8		0.31 (0.55)	0–8
Reactive aggression	0.31 (0.62)	0–6		0.73 (0.87)	0–5
Physical aggression	2.69 (2.48)	0–32		3.54 (2.83)	0–32
Antisocial behavior	0.27 (0.58)	0–10		0.50 (0.81)	0–9
Control variables					
Difficult temperament (1.5 years)			15.8 (more than 1 SD above the mean)		16.5 (more than 1 SD above the mean)
Neurocognitive abilities (2.5 years)			18.3 (more than 1 SD below the mean)		19.1 (more than 1 SD below the mean)
Exposure to physical aggression at home (3.5 years)			6.1 (any exposure reported)		6.1 (any exposure reported)
Total screen time (15 years)			13.0 (more than 1 SD above the mean)		10.3 (more than 1 SD above the mean)
Early aggressive behavior (1.5 years)			16.1 (more than 1 SD above the mean)		13.7 (more than 1 SD above the mean)
Maternal depressive symptoms (5 months)			13.7 (more than 1 SD above the mean)		14.9 (more than 1 SD above the mean)
Maternal education (5 months)			18.9 (no high school completion)		18.5 (no high school completion)
Parental antisocial behavior history (5 months)			15.6 (more than 1 SD above the mean)		16.4 (more than 1 SD above the mean)
Hostile/reactive parenting (1.5 years)			4.4 (more than 1 SD above the mean)		6.0 (more than 1 SD above the mean)
Family dysfunction (1.5 years)			16.8 (more than 1 SD above the mean)		14.4 (more than 1 SD above the mean)
Household income (3.5 years)			16.1 (insufficient income)		15.9 (insufficient income)
Family structure (15 years)			16.0 (single-parent household)		14.4 (single-parent household)

Notes. M: mean; SD: standard deviation. All analyses were adjusted for attrition bias. Data sourced from the final master dataset of the Quebec Longitudinal Study of Child Development (1998–2013), © Gouvernement du Québec, Institut de la Statistique du Québec.

Table 2 presents unstandardized regression coefficients (with standard errors) indicating the associations between various early childhood and family factors and the extent of exposure to violent television programming.

Among boys, higher levels of witnessed physical aggression in the home at 3.5 years of age (β = 0.098, p = 0.002, 95 percent CI [0.119–0.534]), a parental background of antisocial conduct reported at five months (β = 0.103, p = 0.001, 95 percent CI [0.088–0.355]), and greater displays of aggressive behavior by the child himself at 17 months (β = 0.077, p = 0.025, 95 percent CI

[0.022–0.336]) were linked to increased viewing of violent TV content.

For girls, elevated exposure to domestic physical aggression at 3.5 years (β = 0.100, p = 0.002, 95 percent CI [0.108–0.483]), parental antisocial history noted at five months (β = 0.081, p = 0.012, 95 percent CI [0.035–0.282]), lower household income at 3.5 years (β = 0.073, p = 0.034, 95 percent CI [0.010–0.269]), higher child aggressive tendencies at 17 months (β = 0.088, p = 0.007, 95 percent CI [0.046–0.294]), and greater total screen usage at fifteen years (β = 0.073, p = 0.022, 95 percent CI [0.022–0.286]) were related to higher consumption of violent television material.

Table 2. Unstandardized regression coefficients (standard error) for the adjusted associations between pre-existing and concurrent child and family characteristics (ages 5 months to 15 years) and violent television viewing at ages 3.5 and 4.5 years for girls and boys

Confounding Variables	Boys b (SE)	Girls b (SE)
Difficult temperament (1.5 years)	0.08 (0.07)	0.01 (0.06)
Neurocognitive abilities (2.5 years)	0.02 (0.06)	0.09 (0.06)
Exposure to physical aggression at home (3.5 years)	0.33 (0.11) **	0.30 (0.10) **
Total screen time (fifteen years)	−0.07 (0.08)	0.15 (0.07) *
Maternal depressive symptoms (five months)	0.02 (0.07)	0.10 (0.07)
Maternal education (five months)	0.01 (0.07)	0.01 (0.06)
Parental history of antisocial behavior (five months)	0.22 (0.07) ***	0.16 (0.06) **
Hostile parenting (1.5 years)	−0.13 (0.11)	−0.15 (0.11)
Family dysfunction (1.5 years)	0.03 (0.07)	0.06 (0.06)
Family income (3.5 years)	0.06 (0.73)	0.14 (0.07) *
Family composition (fifteen years)	0.06 (0.07)	−0.06 (0.06)
Baseline aggressive behavior (1.5 years)	0.18 (0.08) *	0.17 (0.06) **
R^2	0.047 ***	0.058 ***

Notes. *p < 0.05, **p < 0.01, **p < 0.001. Analyses were adjusted for attrition bias. Data were drawn from the final master dataset of the Quebec Longitudinal Study of Child Development (1998–2013), © Gouvernement du Québec, Institut de la Statistique du Québec.

Table 3 presents unstandardized regression coefficients (with standard errors) illustrating the association between early exposure to violent television during the preschool years and externalizing behaviors at age 15 for both girls and boys. The findings showed that, for boys only, exposure to violent TV between ages 3.5 and 4.5 years was linked to increased risk of externalizing behavior, even after accounting for all early and concurrent covariates. The results are reported using standardized regression coefficients.

Table 3. Unstandardized regression coefficients (with standard errors) for the adjusted associations between preschool exposure to violent television and antisocial behaviors at age 15 in girls and boys

	Predictor and Confound Controls	b (SE)			
		Reactive Aggression	Proactive Aggression	Antisocial Behavior	Physical Aggression
Girls	Violent televiewing (3.5 and 4.5 years)	0.036 (0.028)	−0.024 (0.024)	0.009 (0.027)	−0.049 (0.114)
	Control variables				
	Difficult temperament (1.5 years)	0.038 (0.055)	0.061 (0.047)	−0.048 (0.052)	0.320 (0.219)
	Neurocognitive skills (2.5 years)	0.008 (0.051)	0.070 (0.044)	0.037 (0.048)	0.011 (0.204)
	Physical aggression exposure at home (3.5 years)	−0.008 (0.084)	0.180 (0.072) **	0.222 (0.080) **	0.354 (0.338)
	Overall screen time (fifteen years)	0.098 (0.059)	0.017 (0.050)	−0.027 (0.056)	0.685 (0.236) **
	Maternal depressive symptoms (five months)	0.038 (0.059)	0.007 (0.050)	−0.021 (0.056)	0.097 (0.235)
	Maternal education (five months)	0.058 (0.053)	0.013 (0.046)	0.032 (0.050)	0.194 (0.213)

	Parental antisocial behavior (five months)	0.171 (0.055) **	0.131 (0.047) **	0.168 (0.052) ***	0.816 (0.221) ***
	Hostile parenting (1.5 years)	0.079 (0.097)	−0.006 (0.083)	0.081 (0.092)	0.073 (0.390)
	Family dysfunction (1.5 years)	0.004 (0.053)	0.002 (0.046)	0.001 (0.051)	0.138 (0.214)
	Family income (3.5 years)	0.191 (0.058) ***	0.048 (0.050)	0.090 (0.055)	0.722 (0.232) **
	Family configuration (fifteen years)	−0.135 (0.054) **	−0.071 (0.046)	−0.025 (0.051)	−0.543 (0.217) **
	Baseline aggressive behavior (1.5 years)	−0.018 (0.056)	−0.021 (0.048)	0.027 (0.053)	−0.112 (0.223)
	R^2	0.046 ***	0.026 *	0.034 **	0.054 ***
Boys	Violent televiewing (3.5 and 4.5 years)	0.066 (0.035)	0.045 (0.022) *	0.076 (0.032) *	0.264 (0.114) *
	Control variables				
	Difficult temperament (1.5 years)	−0.026 (0.077)	−0.060 (0.049)	0.028 (0.070)	−0.115 (0.248)
	Neurocognitive skills (2.5 years)	0.033 (0.071)	0.041 (0.045)	0.008 (0.065)	0.172 (0.228)
	Physical aggression exposure at home (3.5 years)	−0.113 (0.117)	−0.054 (0.074)	−0.031 (0.107)	−0.332 (0.378)
	Overall screen time (fifteen years)	−0.129 (0.091)	−0.231 (0.058) ***	−0.302 (0.084) ***	−0.562 (0.295)
	Maternal depressive symptoms (5 months)	0.179 (0.080) *	0.053 (0.050)	0.105 (0.073)	0.683 (0.257) **
	Maternal education (five months)	0.168 (0.076) *	−0.007 (0.048)	0.014 (0.070)	0.282 (0.246)
	Parental antisocial behavior (five months)	0.185 (0.075) **	0.101 (0.048) *	0.260 (0.069) ***	0.778 (0.243) ***
	Hostile parenting (1.5 years)	−0.060 (0.118)	0.007 (0.074)	0.051 (0.108)	−0.012 (0.380)
	Family dysfunction (1.5 years)	−0.146 (0.080)	−0.034 (0.051)	−0.117 (0.073)	−0.605 (0.259) *
	Family income (3.5 years)	0.171 (0.080) *	0.093 (0.050)	0.163 (0.073) *	0.404 (0.258)
	Family configuration (fifteen years)	0.016 (0.079)	−0.067 (0.050)	−0.066 (0.072)	−0.060 (0.256)
	Baseline aggressive behavior (1.5 years)	0.081 (0.084)	0.022 (0.053)	0.081 (0.077)	0.110 (0.271)
	R^2	0.041	0.037 ***	0.054	0.043

Notes: *p < 0.05, **p < 0.01, ***p < 0.001. Analyses were adjusted to account for attrition bias. Data were derived from the final master dataset of the Quebec Longitudinal Study of Child Development (1998–2013), © Gouvernement du Québec, Institut de la Statistique du Québec.

Among male preschoolers, exposure to violent television content was linked to elevated self-reported measures of proactive and physical aggression, along with antisocial tendencies during adolescence. Relative to boys with lower levels of such exposure, those with higher preschool viewing of violent material showed a 6.5% unit rise in proactive aggression (p = 0.043, 95% confidence interval [CI], 0.001–0.089), a 7.4% unit rise in physical aggression (p = 0.021, 95% confidence interval [CI], 0.040–0.487), and a 7.6% unit rise in antisocial behavior (p = 0.013, 95% confidence interval [CI], 0.013–0.140) by age 15. Regarding control variables, total screen time, parental history of antisocial conduct, maternal depression, maternal educational attainment, household income, and family dysfunction all correlated with aspects of externalizing problems.

For female preschoolers, viewing violent television content did not forecast increased self-reported externalizing problems in adolescence. Among the control factors, exposure to physical aggression in the home, parental antisocial conduct, total screen time, household income, and family structure were linked to externalizing indicators.

Over the last ten years, an expert panel convened by the American Psychological Association (APA) thoroughly reviewed and conducted meta-analyses of research on violent video games published from 2009 to 2013 [36]. The panel determined that such exposure correlated with heightened physiological activation, as well as greater aggressive thoughts, emotions, and actions. Additionally, strong links emerged with desensitization and diminished empathy. The magnitude of these effects aligned with earlier meta-analyses from 2005 to 2013, indicating consistent patterns and highlighting greater susceptibility in males across studies. That said, the report noted a lack of adequate data to establish ties between violent media

exposure and delinquency or criminal acts. Consistent with expectations, the current epidemiological approach—drawing on various data points across childhood in a typical middle-class sample—revealed clear prospective linear connections between parent-reported early violent television viewing and later self-reported externalizing outcomes eleven years onward.

This research particularly highlights enduring risks for self-reported proactive and physical aggression among teenage boys. Early childhood contact with violent material foreshadowed subsequent tendencies toward actions like assaulting or striking others to gain advantages, steal, or for no clear motive. These patterns encompassed threats, verbal abuse, participation in gang-related conflicts, and even weapon use. The results reinforce prior warnings about the subtle long-term dangers of early violent media consumption for developmental issues [1, 2, 36].

Critically, the study identified persistent associations with self-reported antisocial tendencies in males. Violent television viewing in preschool years forecasted outcomes at age 15 such as legal proceedings for crimes, detention in juvenile facilities, and encounters with police. Pronounced violent inclinations during adolescence bode poorly for future growth, as they often endure and contribute to challenges in relationships, family dynamics, and education [3, 37].

It is essential not to dismiss modest yet statistically significant effects, as they may accumulate gradually, shaping behavioral patterns throughout life. Externalizing issues in adolescence frequently carry into adulthood [38], where those with the most severe manifestations are four to five times more prone to later disruptive or emotional disturbances [39]. Aggression in teens is tied to difficulties in personal well-being, family relations, and academics, including elevated depression, anxiety, reduced self-worth, and weaker family bonds [40]. Teens exhibiting antisocial patterns face higher risks of substance abuse, anxiety, mood problems, and impaired interpersonal functioning later in life [41]. Such consequences intensify when externalizing patterns begin early, persist past adolescence, and heighten vulnerability to broader psychosocial problems [38-41].

Greater overall screen time in preschool boys, independent of violent elements, was related to heightened proactive aggression, physical aggression, and delinquent acts. This could stem from reduced chances for peer interactions, limiting real-world conflicts and opportunities to manage aggression, in line with the displacement of time theory [4]. Alternatively, such exposure might foster attitudes that incline individuals toward negative, intolerant responses in social rivalries or disputes [1-3, 36]. Research by Lavados-Romo *et al*. (2021) [42] similarly indicates that excessive screen time links to diminished life quality, greater isolation, and poorer connections with peers. Earlier work identified prospective links between violent TV viewing and social isolation in these same participants at ages 10 and 12, particularly among boys, pointing to tendencies toward withdrawal [4, 6].

Several theoretical frameworks can help explain these results. Central among them are the well-established impacts of social modeling during critical stages of psycho-social development [14]. Exposure to violent media is likely to evoke aggressive cognitions, heightened anger, and physiological arousal, all of which are shaped by individual traits and situational contexts; these factors subsequently influence evaluation and decision-making processes, guiding whether an individual engages in aggressive or non-aggressive behaviors [2]. Evidence also suggests a link between media violence exposure and both proactive and physical aggression [3]. When children encounter violent content before developing a robust ability to distinguish fiction from reality, their interpretations may be biased, affecting their reactions to such stimuli [14, 15]. This can lead children to make more hostile attributions toward others and respond aggressively in ambiguous social situations, perceiving the environment as inherently threatening [42, 43]. Over time, these social-cognitive processes may become internalized, helping to explain why early exposure to television violence is associated with increased antisocial behaviors during adolescence [36].

In our study, significant associations were observed only among boys. This finding aligns with known sex differences in content preferences, as boys typically favor fast-paced and aggressive material [26]. This is consistent with social learning theory, which demonstrated that boys displayed higher levels of physical aggression than girls across all conditions in Bandura's Bobo doll experiment [14]. The premise of the experiment was that children model behaviors of individuals they identify with. It is plausible that boys exhibit more aggression because violent characters in media are predominantly male [1-3, 15]. Furthermore, as aggressive acts are often rewarded in films, children may be motivated to replicate these behaviors in social

interactions, even in the absence of direct threats [42]. Repeated exposure to violent television content also fosters desensitization, diminishing sensitivity to others' suffering and empathy while potentially promoting positive attitudes toward violence [15, 42, 43]. These processes provide a conceptual link between proactive aggression and antisocial tendencies emerging from early violent media exposure.

This study has several limitations. First, its observational nature precludes causal inferences. Nevertheless, the inclusion of a wide range of covariates representing both individual and contextual factors helps mitigate alternative explanations. Second, accurately capturing children's real-world exposure to violent content remains challenging. Our operationalization of violent televiewing as a single-item measure may have introduced subjectivity and recall bias. More precise assessments could include direct observation, detailed media diaries, or objective coding of programs. Parent-reported exposure may have been skewed by social desirability, and adolescents' self-reports might have been similarly influenced. Additionally, our confound-controlled analyses aimed to isolate violence exposure from pre-existing child and family characteristics. Despite these methodological constraints, significant long-term associations with aggression and antisocial behavior were observed. Finally, the study did not examine potential mediating mechanisms between exposure and outcomes, which could have provided a more nuanced understanding of how early violent media exposure translates into adolescent externalizing behaviors.

Among the study's strengths, the data were derived from the Quebec Longitudinal Study of Child Development (QLSCD), a large, representative cohort of Quebec's population tracked prospectively for over 20 years. This design enabled observation of natural exposure to violent television content, circumventing ethical concerns associated with experimental manipulation. Children born in the late 1990s represent one of the last cohorts to experience early childhood without the ubiquitous digital technologies of today, allowing a more accurate historical assessment of television exposure. This reduces potential confounding from modern factors such as portable devices, private viewing contexts, and the diverse media landscape currently available, which complicates parental monitoring and exposure measurement. Moreover, our sex-stratified analyses clearly highlight differences between boys and girls. Measuring early exposure during preschool years and linking it to adolescent outcomes addresses a significant gap in the literature, as emphasized in the APA technical report [36].

The observed associations between preschool exposure to violent television and subsequent hostile and antisocial behaviors extending over a decade highlight the importance of both clinical and policy-level interventions. Early identification and intervention for children exposed to violent content could mitigate long-term aggressive tendencies. Future research should examine more detailed aspects of this relationship, including the specific nature of violent content and potential protective factors. Employing mixed-method approaches and considering moderators or mediators would improve understanding of the phenomenon and help identify which children are most vulnerable to adverse effects. Stricter regulations regarding content intended for preschool audiences are warranted to ensure developmental appropriateness [36]. Public health strategies, including media literacy programs in schools, can help children and parents critically navigate media influences and understand the potential consequences of exposure [1-3, 42]. Finally, preventive campaigns targeting parents and communities about the risks of early violent media exposure could foster healthier developmental trajectories in children and adolescents.

Acknowledgments: None

Conflict of Interest: None

Financial Support: None

Ethics Statement: None

References

1. Council on Communications and Media. Virtual violence. *Pediatrics* 2016, *138*, e20161298.
2. Anderson, C.A.; Bushman, B.J.; Bartholow, B.D.; Cantor, J.; Christakis, D.; Coyne, S.M.; Donnerstein, E.; Brockmyer, J.F.; Gentile, D.A.; Green, C.S.; et al. Screen violence and youth behavior. *Pediatrics* 2017, *140* (Suppl. S2), 142–147.
3. Eron, L.D.; Huesmann, L.R.; Lefkowitz, M.M.; Walder, L.O. Does television violence cause aggression? *Am. Psychol.* 1972, *27*, 253–263.

4. Fitzpatrick, C.; Barnett, T.; Pagani, L.S. Early exposure to media violence and later child adjustment. *J. Dev. Behav. Pediatr.* 2012, *33*, 291–297.
5. Pagani, L.S.; Bernard, J.; Fitzpatrick, C. Prospective associations between preschool exposure to violent televiewing and psychosocial and academic risks in early adolescent boys and girls. *J. Dev. Behav. Pediatr. JDBP* 2023, *44*, e1–e11.
6. Rideout, V.; Robb, M.B. The Common Sens Census: Media Use by Kids Age Zero to Eight. 2020. Available online: https://www.commonsensemedia.org/sites/default/files/research/report/2020_zero_to_eight_census_final_web.pdf (accessed on 12 December 2024).
7. Prot, S.; Anderson, C.A.; Barlett, C.P.; Coyne, S.M.; Saleem, M. Content effects: Violence in the media. *Int. Encycl. Media Eff.* 2017, 1–19.
8. Gentile, D.A.; Li, D.; Khoo, A.; Prot, S.; Anderson, C.A. Mediators and moderators of long-term effects of violent video games on aggressive behavior: Practice, thinking, and action. *JAMA Pediatr.* 2014, *168*, 450–457.
9. Ferguson, C.J. Does media violence predict societal violence? It depends on what you look at and when. *J. Commun.* 2015, *65*, E1–E22.
10. Bronfenbrenner, U.; Morris, P.A. The bioecological model of human development. In *Handbook of Child Psychology: Vol. 1. Theoretical Models of Human Development*, 6th ed.; Lerner, R.M., Ed.; Wiley: Hoboken, NJ, USA, 2006; pp. 793–828.
11. Belsky, J.; Pluess, M. Beyond diathesis-stress: Differential susceptibility to environmental influences. *Psychol. Bull.* 2009, *135*, 885–908.
12. Huesmann, L.R.; Moise-Titus, J.; Podolski, C.-L.; Eron, L.D. Longitudinal relations between children's exposure to TV violence and their aggressive and violent behavior in young adulthood: 1977–1992. *Dev. Psychol.* 2003, *39*, 201–221.
13. Robertson, L.A.; McAnally, H.M.; Hancox, R.J. Childhood and adolescent television viewing and antisocial behavior in early adulthood. *Pediatrics* 2013, *131*, 439–446.
14. Bandura, A. *Social Learning Theory*; Prentice-Hall: Hoboken, NJ, USA, 1977.
15. Dodge, K.A.; Crick, N.R. Social information-processing bases of aggressive behavior in children. *Personal. Soc. Psychol. Bull.* 1990, *16*, 8–22.
16. Huesmann, L.R.; Eron, L.D.; Klein, R.; Brice, P.; Fischer, P. Mitigating the imitation of aggressive behaviors by changing children's attitudes about media violence. *J. Personal. Soc. Psychol.* 1983, *44*, 899–910.
17. Anderson, C.A.; Bushman, B.J. Media violence and the general aggression model. *J. Soc. Issues* 2018, *74*, 386–413.
18. Zhang, Q.; Cao, Y.; Tian, J. Effects of violent video games on players' and observers' aggressive cognitions and aggressive behaviors. *J. Exp. Child Psychol.* 2021, *203*, 105005.
19. Helzer, J.E.; Robins, L.N. The diagnostic interview schedule: Its development, evolution, and use. *Soc. Psychiatry Psychiatr. Epidemiol.* 1988, *23*, 6–16.
20. Huesmann, L.R.; Lagerspetz, K.; Eron, L.D. Intervening variables in the TV violence–aggression relation: Evidence from two countries. *Dev. Psychol.* 1984, *20*, 746–775.
21. Totsika, V.; Sylva, K. The home observation for measurement of the environment revisited. *Child Adolesc. Ment. Health* 2004, *9*, 25–35.
22. Burkhardt, J.; Lenhard, W. A meta-analysis on the longitudinal, age-dependent effects of violent video games on aggression. *Media Psychol.* 2022, *25*, 499–512.
23. Grotewell, G.P.; Burton, Y.R. *Early Childhood Education: Issues and Developments*; Nova Science Publishers: Hauppauge, NY, USA, 2008.
24. Amin, A.; Kågesten, A.; Adebayo, E.; Chandra-Mouli, V. Addressing gender socialization and masculinity norms among adolescent boys: Policy and programmatic implications. *J. Adolesc. Health Off. Publ. Soc. Adolesc. Med.* 2018, *62*, S3–S5.
25. Moise, J.F.; Huesmann, L.R. Television violence viewing and aggression in females. *Ann. N. Y. Acad. Sci.* 1996, *794*, 380–383.
26. Twenge, J.M.; Martin, G.N. Gender differences in associations between digital media use and psychological well-being: Evidence from three large datasets. *J. Adolesc.* 2020, *79*, 91–102.
27. Côté, S. *Mental Health and Maladjustment in Adolescence Questionnaire*; Institut de la statistique du Québec: Québec, QC, Canada, 2012; Available online: https://www.jesuisjeserai.stat.gouv.qc.ca/informations_chercheurs/outils_collecte/QELJ-

naissance-20ans.pdf (accessed on 12 December 2024).
28. Statistics Canada. National Longitudinal Survey of Children and Youth (NLSCY). 1998. Available online: https://www23.statcan.gc.ca/imdb/p2SV_f.pl?Function=getSurvey&Id=4631&db=IMDB (accessed on 12 December 2024).
29. Bates, J.E.; Freeland, C.A.; Lounsbury, M.L. Measurement of infant difficultness. *Child Dev.* 1979, *50*, 794–803.
30. Alp, I.E. Measuring the size of working memory in very young children: The imitation sorting task. *Int. J. Behav. Dev.* 1994, *17*, 125–141.
31. Radloff, L.S. The CES-D Scale: A self-report depression scale for research in the general population. *Appl. Psychol. Meas.* 1977, *1*, 385–401.
32. Statistics Canada. General Social Survey–Education, Work and Retirement (GSS). 1994. Available online: https://www23.statcan.gc.ca/imdb/p2SV_f.pl?Function=getSurvey&SDDS=4500 (accessed on 12 December 2024).
33. Townsend, L.; Kobak, K.; Kearney, C.; Milham, M.; Andreotti, C.; Escalera, J.; Alexander, L.; Gill, M.K.; Birmaher, B.; Sylvester, R.; et al. Development of three web-based computerized versions of the kiddie schedule for affective disorders and schizophrenia child psychiatric diagnostic interview: Preliminary validity data. *J. Am. Acad. Child Adolesc. Psychiatry* 2020, *59*, 309–325.
34. Epstein, N.B.; Baldwin, L.M.; Bishop, D.S. The McMaster family assessment device. *J. Marital Fam. Ther.* 1983, *9*, 171–180.
35. Hiltz, A. Survey on Labour and Income Dynamics (SLID): Interview Questionnaire for the Entry and Exit Component for the Reference Year 2005. Statistic Canada. 2005. Available online: https://www150.statcan.gc.ca/n1/pub/75f0002m/75f0002m2007002-fra.pdf (accessed on 12 December 2024).
36. Calvert, S.L.; Appelbaum, M.; Dodge, K.A.; Graham, S.; Nagayama Hall, G.C.; Hamby, S.; Fasig-Caldwell, L.G.; Citkowicz, M.; Galloway, D.P.; Hedges, L.V. The American Psychological Association Task Force assessment of violent video games: Science in the service of public interest. *Am. Psychol.* 2017, *72*, 126–143.
37. Eron, L.D. Parent–child interaction, television violence, and aggression of children. *Am. Psychol.* 1982, *37*, 197–211.
38. Frick, P.; Lahey, B.; Loeber, R.; Tannenbaum, L.; Van Horn, Y.; Christ, M.; Hart, E.; Hanson, K. Oppositional defiant disorder and conduct disorder: A meta-analytic review of factor analyses and cross-validation in a clinic sample. *Clin. Psychol. Rev.* 1993, *13*, 319–340.
39. Sourander, A.; Pihlakoski, L.; Aromaa, M.; Rautava, P.; Helenius, H.; Sillanpaa, M. Early predictors of parent- and self-reported perceived global psychological difficulties among adolescents. *Soc. Psychiatry Psychiatr. Epidemiol.* 2006, *41*, 173–182.
40. Reef, J.; Diamantopoulou, S.; van Meurs, I.; Verhulst, F.C.; van der Ende, J. Developmental trajectories of child to adolescent externalizing behavior and adult DSM-IV disorder: Results of a 24-year longitudinal study. *Soc. Psychiatry Psychiatr. Epidemiol.* 2011, *46*, 1233–1241.
41. Moffit, T.E.; Caspi, A.; Harrington, H.; Milne, B.J. Males on the life-course-persistent and adolescence-limited antisocial pathways: Follow-up at age 26 years. *Dev. Psychopathol.* 2002, *14*, 179–207.
42. Huesmann, L.R. An integrative theoretical understanding of aggression: A brief exposition. *Curr. Opin. Psychol.* 2018, *19*, 119–124.
43. Ybarra, M.L.; Mitchell, K.J.; Oppenheim, J.K. Violent media in childhood and seriously violent behavior in adolescence and young adulthood. J. Adolesc. Health 2022, 71, 285–292.