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Cara S. Swit, Megan Gath, Jenna Gawn, Jennifer Smith, Mia A. McLean & Ying Wang

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**Early Exposure to Aggressive and Prosocial Television Content and Children's
Social and Behavioral Development From Ages 2 to 8**

Cara S. Swit¹, Megan Gath², Jenna Gawn², Jennifer Smith², Mia A. McLean³, Ying Wang³

¹Faculty of Health, University of Canterbury, Christchurch, New Zealand, 8041.

cara.swit@canterbury.ac.nz

²Child Wellbeing Research Institute, University of Canterbury, Christchurch, New Zealand, 8041.

Megan.gath@canterbury.ac.nz

jenna.gawn@canterbury.ac.nz

jennifer.smith@canterbury.ac.nz

³Auckland University of Technology, Auckland, New Zealand 1010.

Mia.mclean@aut.ac.nz

y.wang@aut.ac.nz

Correspondence concerning this article should be addressed to Cara S. Swit, Faculty of Health, University of Canterbury, Christchurch, New Zealand 8041. E-mail: cara.swit@canterbury.ac.nz

ORCID 0000-0002-7198-5869

Abstract

Background

Early childhood is a sensitive developmental period during which television exposure is widespread which may include portrayals of aggressive and prosocial behavior. Although prior research suggests modest associations between media content and child behavior, most studies focus on screen time rather than content quality and typically examine aggressive and prosocial content in isolation. From a public health perspective, there is limited longitudinal evidence on how early exposure to aggressive and prosocial television content, and their co-occurrence, relates to children's social and behavioral development over time.

Methods

Data were drawn from the Growing Up in New Zealand longitudinal cohort. Children's exposure to aggressive and prosocial television content at age 2 was assessed using fine-grained content coding of children's most frequently watched television programmes. Children's conduct problems, peer relationship problems, and prosocial behavior were assessed at ages 2, 4.5, and 8 using the Strengths and Difficulties Questionnaire (N = 5,338). A series of latent growth curve models were estimated to examine associations between aggressive content exposure, prosocial content exposure, their interaction, and overall television viewing time, with children's initial levels and developmental trajectories of social and behavioral outcomes.

Results

Children's television exposure frequently included both aggressive and prosocial behaviors, highlighting the heterogeneity of content viewed by young children. Higher exposure to aggressive television content was associated with higher levels of conduct and peer relationship problems at age 2, though these associations were attenuated after accounting for overall

television viewing time, which predicted a steeper decline in conduct problems across childhood. Exposure to prosocial television content, the co-occurrence of aggressive and prosocial content, and all interaction terms with overall television viewing time were not associated with any outcome at age 2 or over time.

Conclusions

Overall, the findings suggest that early television content exposure is associated with behavioral differences early in development, though associations with developmental change across childhood did not contribute beyond the contribution of total television viewing time. From a public health perspective, these findings highlight the importance of considering television content quality alongside viewing quantity, recognizing that both are embedded within broader family and developmental contexts that warrant further investigation.

Keywords: violent media, aggressive media, prosocial media, early childhood, middle childhood, television, television content, Growing Up in New Zealand

Introduction

Television remains one of the most common and influential forms of media exposure during early childhood, even amid the growing availability of newer digital devices such as tablets and smartphones (Mann et al., 2025). For many toddlers, television represents their first sustained experience with digital media, and despite shifts toward portable devices, television content continues to play a key role in young children's media environments (Holmgren et al., 2023). Early childhood is a period of heightened developmental sensitivity, when social learning, self-regulation, and moral understanding are rapidly developing. During this time, children acquire foundational social-emotional competencies such as empathy, emotion identification, impulse control, and problem-solving, which are shaped by the social models and environments they encounter (Bandura, 1977; Bronfenbrenner & Morris, 1998; Sigelman, 2022). Accordingly, television may serve as an important socializing context through which children learn and develop.

Theoretical Framework

Social learning theory (Bandura, 1973) and script theories (Buckley & Anderson, 2006; Huesmann, 1988) provide a framework for understanding how children may learn behavioral patterns through repeated exposure to media content. Through observation, children may encode social norms and behavioral scripts that guide their own behavior, particularly when aggression is portrayed as justified, rewarded, or without consequence (Carnagey & Anderson, 2005). Similar processes have been proposed for prosocial media exposure, whereby repeated exposure to helping or cooperative behaviors may support children's prosocial development (Prot et al., 2014). From this perspective, exposure to aggressive and prosocial behaviors can be

conceptualized as continuous dimensions of children's media exposure that may co-occur within the same episode or programme, rather than as mutually exclusive content types.

Media Exposure During Early Childhood

Media exposure in early childhood occurs within a highly scaffolded environment (Chiong & Shuler, 2010). Television viewing at this age is largely shaped by parental choices, family routines, and co-viewing practices, with limited child autonomy or unsupervised exposure. Children's ability to independently interpret, evaluate, or generalize media messages is likely still emerging, and their engagement with television content is embedded within broader family contexts (Barr et al., 2024). These developmental considerations may influence the extent to which early media exposure shapes longer-term behavioral development, while still allowing early differences in exposure to be associated with early behavioral variation. At a population level, even modest associations between early media exposure and children's behavioral development may have meaningful public health implications when exposure is widespread and occurs during sensitive developmental periods (Gentile et al., 2007).

Although research on children's media use has expanded considerably, most studies have focused on *how much* time children spend watching screens rather than *what* they watch (Zosh et al., 2023). There is a shift in focus from quantity to quality, reflecting a growing recognition that media content plays a critical role in shaping developmental outcomes through mechanisms of social learning. From this perspective, television content can model both risk and protection. Exposure to aggressive or violent content may reinforce hostile scripts for problem-solving, while exposure to prosocial or educational content can foster cooperation, empathy, and helping behaviors (Gentile et al., 2009).

In reality, children's media diets extend beyond child-focused television programming. Young children are also exposed to background television (Lapierre et al., 2012), short-form online content such as YouTube (Henderson et al., 2024), and movies. This heterogeneity highlights the need for research that captures multiple dimensions of children's media environments, including both content quality and viewing content, to better understand how early media exposure relates to children's development.

Importantly, early television exposure is also socially patterned. Parental education, socioeconomic conditions, and child characteristics are associated with differences in children's media use and the types of content children are exposed to (Barr et al., 2024; Holmgren et al., 2023). These early demographic characteristics are also linked to children's social and behavioral development, suggesting that early exposure to aggressive and prosocial television content may reflect broader patterns of family routines, resources, and child characteristics rather than simply direct causal effects (Gentile et al., 2007). Describing how children's exposure to different television content varies by sociodemographic characteristics, therefore provides important context for interpreting associations between early media exposure and children's developmental outcomes.

Aggressive and Prosocial Media Content

A recent large-scale meta-analysis of screen use during early childhood (birth to 5.99 years; Mallawaarachchi et al., 2024) provides some of the strongest evidence to date that the *type* and *appropriateness* of digital media content, rather than screen time alone, are critical for child developmental outcomes. Across 100 studies (N = 176,742 participants), programme viewing (including television) compared with gaming or app use was modestly associated with poorer

cognitive (language, executive function, and academic skills) and psychosocial (prosocial behavior, social-emotional competence, and internalizing/externalizing behaviors) outcomes, while exposure to age-inappropriate content (i.e., violent, action, or intended for a mature audience) was uniquely linked to higher psychosocial difficulties. Although effect sizes were small (approximately 0.03 to 0.16), they were comparable to those found in prior reviews examining screen use and child outcomes (Adelantado-Renau et al., 2019; Bustamante et al., 2023; Eirich et al., 2022; Madigan et al., 2020). Importantly, experimental studies within this meta-analysis showed that replacing age-inappropriate or violent programming with age-appropriate, educational, or prosocial content led to short-term improvements in children's socioemotional skills and behavior.

While viewing aggressive or violent content can contribute to children's negative behavioral outcomes, exposure to prosocial content may have the opposite effect. There is some evidence that prosocial media (e.g., children's television shows such as Sesame Street and Daniel Tiger's Neighbourhood) can foster empathy, cooperation, and sharing. A meta-analysis of 72 studies ($N = 17,134$ participants) by Coyne and colleagues (2018) found that exposure to prosocial media was associated with higher levels of prosocial behavior and empathic concern, and lower levels of aggressive behavior, across media types and developmental stages. However, the authors noted that research on prosocial content remains limited relative to the extensive literature on media violence, and no updated meta-analysis has since been published.

Recognizing that media messages rarely fall neatly into "aggressive" or "prosocial" categories, Holmgren et al. (2019) introduced the concept of *prosocial violent content*, describing television content in which aggression is used with the intent to help or defend others (e.g., superhero violence, avenging a friend). In this study, aggression and prosocial behavior are distinguished

based on the intent of the action, such that prosocial violence involves harming an individual to benefit another. Their findings suggest that higher exposure to prosocial violent content is positively associated with higher levels of physical and relational aggression but not associated with prosocial behavior, in adolescence.

The present study builds on this work by examining the co-occurrence of aggressive and prosocial behaviors within early childhood television content. Rather than coding the intent underlying aggressive acts, we quantify how often aggressive and prosocial behaviors appear within the same episodes and programmes. In young children's television programmes, aggressive behaviors (e.g., physical or verbal fighting, weapon play) and prosocial behaviors (e.g., helping, sharing) may appear within the same episode without aggression necessarily serving a prosocial goal. For example, in the *Bluey* episode "*Surprise*" (Season 3, Episode 41), gun play is portrayed as a normal and humorous part of a family interaction, yet the episode simultaneously models sharing, cooperation, imaginative play and turn-taking within a playful, prosocial context. Such examples illustrate how aggressive and prosocial behaviors can co-exist within the same episode, potentially contributing to the normalization of aggression within otherwise prosocial narratives. To date, few studies have examined early exposure to television content in which aggressive and prosocial behaviors co-occur or explored the longitudinal implications of such exposure for young children's social and behavioral development.

The current study builds on this work by adopting a content-focused approach that quantifies aggressive and prosocial behaviors within television episodes watched by young children and examines their co-occurrence. By examining the co-occurrence of aggressive and prosocial behaviors, this approach captures the moral and behavioral complexity of children's television programming without assuming clear boundaries between content types.

The Current Study

Despite growing interest in media content quality, relatively few longitudinal studies have examined how early exposure to specific television content relates to children's social and behavioral development over time. Many longitudinal studies continue to rely on overall screen time rather than content-specific measures, and fewer incorporate fine-grained content coding procedures like the one we've used in this study. Moreover, most longitudinal studies focus on later childhood or adolescence, with limited attention to exposure occurring as early as age 2. The present study addresses these gaps by combining detailed content coding of children's television programmes with longitudinal modelling of children's social and behavioral outcomes from early to middle childhood.

This study examines whether early exposure to aggressive and prosocial television content, and their co-occurrence predicts children's initial levels and developmental trajectories of conduct problems, peer relationship problems, and prosocial behavior from ages 2 to 8. To aid interpretation and describe children's real-world television viewing patterns, we also identified descriptive exposure profiles of children's television exposure based on combinations of high and low aggressive and prosocial content. These profiles were used for descriptive and contextual purposes only. By focusing on both the quality of children's television programmes and overall television viewing time, and by capturing the co-occurrence of aggressive and prosocial behaviors within programmes, this study extends prior research on prosocial violent content (Holmgren et al., 2019) and addresses key gaps in the longitudinal media literature.

By age 2, individual differences in behavior and family routines are likely already evident, and television viewing is largely shaped by parental choices and family context rather than child autonomy, making this a developmentally meaningful period for examining early media

exposure. Rather than asking whether exposure to aggressive content matters, this study examines when and how early exposure to aggressive and prosocial television content, accounting for overall television viewing time, is associated with children's social and behavioral development. Initial levels refer to children's behavior at the first assessment point (age 2), while developmental trajectories reflect patterns of change across ages 2, 4.5, and 8 years.

Specifically, we sought to:

1. Describe children's early television viewing by categorizing the television programmes most frequently watched at age 2 according to their aggressive and prosocial content, and by identifying exposure profiles based on combinations of these content dimensions.
2. Examine whether children's descriptive exposure profiles differ by sociodemographic characteristics, to identify child and family factors associated with early exposure to aggressive and prosocial television content.
3. Examine whether early exposure to aggressive and prosocial television content and their co-occurrence (i.e., their interaction) predict children's initial levels at age 2 and developmental trajectories of conduct problems, peer relationship problems, and prosocial behavior from ages 2 to 8.
4. Examine whether overall television viewing time, and its interaction with aggressive and prosocial television content exposure predict children's initial levels at age 2 and developmental trajectories of conduct problems, peer relationship problems, and prosocial behavior from ages 2 to 8.

Methods

Sample and General Procedure

The data used in this analysis were drawn from the Growing Up in New Zealand (GUiNZ) study, a prospective longitudinal study following more than 6,000 New Zealand children from before birth. A total of 6,822 pregnant women with an estimated delivery date between April 2009 and March 2010 were recruited from the Auckland, Counties Manukau, and Waikato District Health Board regions. Full details of the study design, conceptual framework and recruitment procedures are reported elsewhere (Morton et al., 2010, 2013, 2015).

Ethical approval for the study was granted by the NZ Ministry of Health and Health Disability Ethics Committee (NTY/08106/055), and written informed consent was obtained from all participating mothers. Data was collected through a combination of telephone interviews, face-to-face observations and interviews, and questionnaires across multiple waves between 2009 and 2022. Mothers' mean age at the child's birth was 31.19 years ($SD = 5.63$, range 15-47 years).

For this study, data were drawn from the antenatal assessment and the 9-month assessment (demographic variables only), and from assessments when children were aged approximately 2 years (Time 1), 4.5 years (Time 2), and 8 years (Time 3). Because mothers' reports of children's favorite television shows at age 2 were central to this study, analyses were restricted to children for whom this information was available. This resulted in an analytic sample of $N = 5,338$ (2,782 boys, 2,553 girls, based on mother's report at the 9-month assessment). Mothers reported children's ethnicity as European (67.6%), Māori (25.4%), Pacific Island (21.7%), Asian (16.3%), New Zealander (15.3%), Middle Eastern, Latin American, or African (2.9%), and Other (<0.1%), with multiple ethnic affiliations permitted. Neighborhood socioeconomic deprivation, as measured using the New Zealand Deprivation Index deciles (NZDep; Atkinson et al., 2019), was well distributed, with 27.4% of the sample residing in areas of low deprivation (deciles 1-3),

36.7% in areas of mid deprivation (deciles 4-7), and 35.9% in areas of high deprivation (deciles 8-10).

Measures

Total Television Viewing Time and Exposure to Aggressive and Prosocial Television Content

When children were aged 2, mothers were asked: “*Thinking about the last weekday, i.e. [YESTERDAY/LAST FRIDAY], how many hours did [CHILD NAME] spend at home watching all types of TV, DVDs, and videos?*” Mothers either selected “None” or report the total number of hours. If any viewing was reported, mothers were asked a follow-up question of “*Could you please name the three TV programmes [CHILD NAME] watches most?*”

Mothers selected programmes from a list of 17 popular television shows for young children and could also nominate additional programmes using three open-text fields. Open-text responses were subsequently coded, with the 23 most frequently reported programmes across both list-based and open-text responses were identified for content coding. One programme (The Go Show) could not be coded because publicly available episodes could not be sourced and was therefore excluded. The final content analysis included 22 television programmes.

For each television programme, approximately 60 minutes of content were coded (+/- 10 minutes to ensure inclusion of complete episodes). A research assistant compiled a list of episodes for each programme, and episodes were randomly selected using a random number generator. If a selected episode could not be sourced or was incomplete, the next available episode (in chronological order) was used. As the age 2 GUiNZ assessment occurred in 2012, episodes first aired in 2012 were selected where possible. If a programme did not air episodes in 2012, episodes from the closest preceding year were included, under the assumption that such

episodes would have been re-broadcast in 2012. Coding a standardized amount of content per programme allowed comparability across television shows and is consistent with prior content analysis approaches.

Aggressive and prosocial content were coded using the *Framework for Rating and Assessing Media for Early Childhood* (FRAME; details blinded for review). Aggressive behavior coding was adapted from established schemes (Linder & Gentile, 2009; Smith et al., 2006) and included physical, relational, and verbal aggression. Prosocial behavior was coded using definitions from Padilla-Walker et al. (2013). Table 1 presents the coding definitions.

Coding was frequency-based, with a running tally for each aggressive and prosocial behavior. A composite aggression score was computed by summing frequencies across aggression types. Behavioral rates were then calculated by dividing frequencies by the total coded video length, resulting in rates per minute for aggressive and prosocial behavior.

Table 1. Coding categories of aggressive and prosocial behavior content

Domain	Description
Aggression	
Relational Aggression	Attempts to harm another person's reputation, social status, or relationships, or the use of a relationship to manipulate or cause harm, including humiliation around others or trying to break up someone else's relationship
Physical Aggression	Attempts to harm physically or threaten to harm someone or their possessions, such as hitting or threatening another person with or without a weapon
Verbal Aggression	Direct attempts to hurt someone's feelings using words or gestures, such as teasing or name calling

Prosocial	Any behavior and utterances related to sharing, helping, compassion, empathy, caring, concern, using manners, praise, encouragement
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Television content was coded by a team of trained researchers using the FRAME coding scheme. Prior to formal coding, coders completed joint training and discussion sessions to clarify coding criteria and resolve ambiguities. Pilot coding was conducted on episodes not included in the analysis sample until a minimum interrater agreement of 80% was achieved between coders.

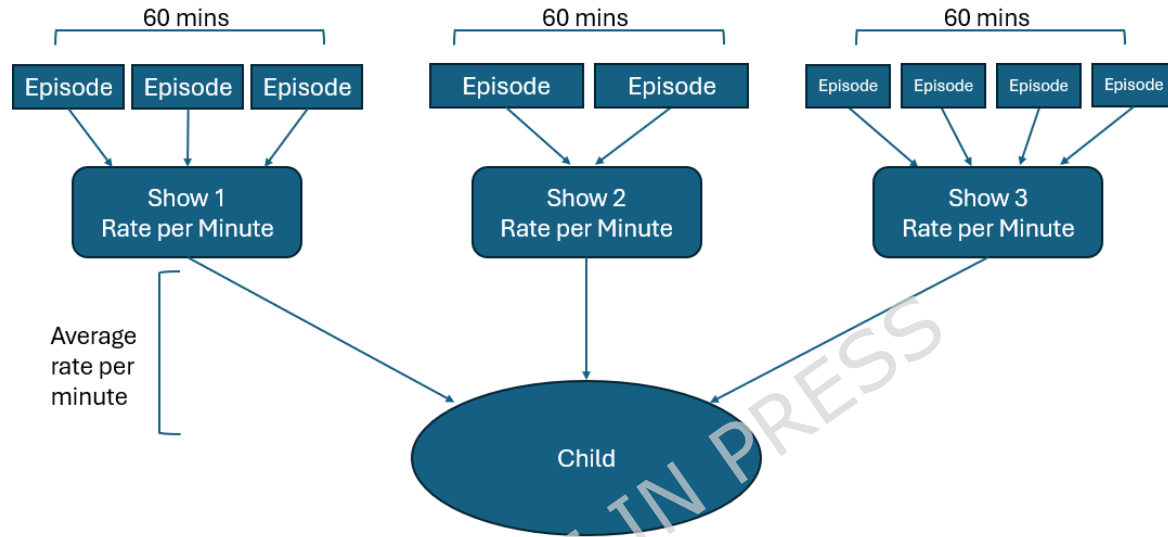
For the main coding, a lead coder coded all selected episodes, and a second coder independently coded 20% of episodes selected using a random number generator. The viewing order of episodes was also randomized to minimize potential coder drift. Interrater reliability was assessed using Krippendorff's alpha and Intraclass Correlations (ICC) for the aggression and prosocial behavior dimensions used in the present study.

Reliability estimates indicated acceptable agreement for both aggression and prosocial content. The reliability coefficient for total aggression was $\alpha = 0.70$ (95% CI = 0.40–0.91) and ICC = 0.68, and for prosocial behavior was $\alpha = 0.70$ (95% CI = 0.54–0.83) and ICC = 0.70, indicating sufficient reliability to support the use of these coded rates in subsequent analyses.

To estimate children's exposure to aggressive and prosocial content, programme-level rates were averaged across parent reports of children's favorite programmes (see Figure 1). Mothers reported up to three programmes per child. For more than half of the children, all reported programmes were among the 22 programmes that were coded ($n = 2,770$ three shows; $n = 1,683$ two shows; $n = 885$ one show). Because programme-specific viewing duration was not assessed, exposure estimates reflect the mean rate of coded content across reported programmes. For

children with only one or two television programmes in the coded sample, exposure estimates were based on the available programmes.

Figure 1. Calculation of rate of exposure to aggression and prosocial content within television viewing



Sociodemographic characteristics. The following sociodemographic variables were examined in relation to television content:

- *Socioeconomic deprivation*, measured using the NZDEP deciles (Atkinson et al., 2019) at the 2-year assessment (1 = lowest deprivation; 10 = highest deprivation).
- *Maternal education*, reported at the antenatal assessment and categorized as no secondary school qualification, secondary school, diploma/trade certificate, bachelor's degree, or higher degree.
- *Number of siblings*, reported at the 2-year assessment.

- *Maternal ethnicity*, reported at the antenatal assessment.
- *Child sex*, reported by the child's mother at the 9-month assessment.

Covariates included in the analytic models were selected based on theoretical relevance and observed associations with television content exposure and child outcomes in preliminary analyses.

Child Social and Behavioral Outcomes

Child social and behavioral outcomes were assessed using maternal reports on the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997, 2001). The Conduct Problems, Peer Relationship Problems, and Prosocial Behavior subscales were administered when children were aged 2, 4.5, and 8 years. Each subscale consists of five items rated on a three-point scale (0 = *not true*, 1 = *somewhat true*, 2 = *certainly true*), with higher scores indicating higher levels of the respective behavior. At Time 2 (age 4.5) one item from the Conduct Problems subscale, "Often fights with other children or bullies them", was unknowingly omitted from the questionnaire. We utilized the imputation procedures developed by Monk and Grimes (2025) whereby the missing item was imputed by calculating a weighted average of scores on the other items of the conduct subscale as follows: imputed fighting score = $0.135(\text{tantrums score}) + 0.061(\text{obeys score}) + 0.223(\text{lies score}) + 0.297(\text{steals score})$.

The SDQ has demonstrated good reliability and validity across diverse samples (Gustafsson et al., 2016; Muris et al., 2003), including for children aged 2 years old in Aotearoa New Zealand (D'Souza et al., 2017). Internal consistency in the present sample was generally acceptable across waves (Cronbach's α range = 0.42-0.73; McDonald's ω range = 0.52-0.90).

Analytic Strategy

Although we initially conceptualized children's television exposure in terms of four theoretically meaningful profiles (high aggression, high prosocial, morally mixed, and low), these categories were used for descriptive and contextual purposes only. Empirically, some of children's most frequently watched programmes were listed under more than one profile, suggesting that none of these exposure profiles were "pure". As a result, fewer than half of children could be uniquely assigned to a single exposure profile. To maximize statistical power and retain the full analytic sample, we therefore modelled exposure to aggressive and prosocial television content as continuous variables and tested their interaction to capture how these behaviors may jointly operate within programmes. We conducted sensitivity analyses using categorical exposure profiles and observed a similar pattern of results, including no evidence of an interactive effect. Accordingly, the continuous analytic approach was selected as the primary strategy and is reported here.

To examine associations between exposure to aggressive and prosocial television content and children's developmental trajectories, we estimated latent growth curve models (LGCM) in *R* using the *lavaan* package (Rosseel, 2012). Separate models were estimated for conduct problems, peer relationship problems, and prosocial behavior. Each LGCM included three repeated measures of each outcome assessed at ages 2, 4.5, and 8 years, which were modelled as indicators of latent intercept and slope factors representing initial level and rate of change over time, respectively. A latent-basis growth model (i.e., the loading for the middle time point was freely estimated) was specified to allow the form of change to vary freely across time, rather than assuming a strictly linear or quadratic pattern. Model fit was evaluated using the χ^2 test, RMSEA, CFI, and TLI indices.

Missing outcome data at later waves primarily reflected longitudinal attrition (largely at age 8, when data was available for 3,829 (71.8%) children). To retain all available information and minimize bias associated with complete-case analysis, models were estimated using robust full-information maximum likelihood estimation (FIML), which provides unbiased parameter estimates under missing-at-random (MAR) assumptions. Participants with missing age-8 outcome data were compared with retained participants on baseline demographic and study variables. Participants lost to follow-up had significantly higher conduct problems and peer relationship problems, higher neighborhood socioeconomic deprivation scores, and lower maternal education at baseline. Because missingness was associated with observed variables included in the model, the MAR assumption underlying FIML estimation was considered plausible.

To test whether exposure to aggressive and prosocial television content predicted individual differences in developmental trajectories, continuous predictors representing children's mean exposure to aggressive and prosocial content across their most frequently watched programmes were added to the models. Their interaction term (Aggressive x Prosocial) was included to test whether the association between exposure to aggressive content and developmental trajectories varied as a function of prosocial content exposure. We also included total television viewing time (time spent watching TV, DVDs, and videos) and the interaction between aggressive content and television viewing time, and between prosocial content and television viewing time as predictors, to determine whether associations between content exposure and outcomes varied as a function of overall television viewing time. All continuous predictors (i.e., aggressive content exposure, prosocial content exposure, and total television viewing time) were mean-centered prior to analysis and all interaction terms were observed product terms.

The latent intercept and slope factors were regressed on aggressive content exposure, prosocial content exposure, their interaction, and covariates (neighborhood socioeconomic deprivation, and maternal education). Residual variances for the observed outcome measures were freely estimated at each assessment wave. Because the latent intercept and slope factors account for shared longitudinal covariance among repeated measures, residual covariances across time were not additionally specified in the primary model. Significance of each path was evaluated using robust (MLR) standard errors. Model-implied slopes were estimated at -1 SD, the mean, and $+1$ SD levels of aggressive content exposure.

Results

Television Content Characteristics

Across the 22 coded television programmes, the mean rate of aggressive behavior was 0.28 incidents per minute (SD = 0.66; range 0 – 2.83). The mean rate of prosocial behavior was higher, at 1.37 incidents per minute (SD = 0.68; range 0.07 – 2.37). Mean rates of aggressive and prosocial behavior per minute for each coded programme are provided in Supplementary Table 1. Programmes varied considerably in their content, with Disney Toons and SpongeBob SquarePants showing the highest rates of aggressive behavior, while Wonder Pets, Handy Manny, and Fireman Sam showed the highest rates of prosocial behavior.

After calculating each child's mean exposure to aggressive and prosocial behavior across their favorite programmes, children were divided into tertiles for descriptive and contextual purposes only. Each tertile reflects low, mid, or high exposure relative to the full sample. These television content exposure profiles were used to characterize the distribution and co-occurrence of

aggressive and prosocial content exposure, and to examine the sociodemographic patterns of exposure. They were not used in the latent growth curve models. Cross-tabulations of aggressive and prosocial exposure tertiles are presented in Table 2.

Table 2. Cross-tabulation (frequency counts) of aggressive exposure and prosocial exposure tertiles

Aggression Exposure	Prosocial Exposure		
	Low	Mid	High
Low	911	567	302
Mid	344	643	792
High	525	569	685
High aggression exposure group (9.8%)			
High prosocial exposure group (5.7%)			
Co-occurring (high aggression and high prosocial) exposure group (12.8%)			
Neutral (low aggression and low prosocial) exposure group (17.1%)			

Based on these cross-tabulations, four descriptive profiles were identified: neutral (low aggression, low prosocial), high prosocial (high prosocial, low aggression), high aggression (high aggression, low prosocial), and co-occurring (high aggression and high prosocial) exposure. Together, these profiles represented 45.4% of the total sample. The remaining children fell into intermediate combinations of exposure and were not assigned to a single profile.

The most frequently watched television programmes within each descriptive profile are shown in Table 3. The most frequently watched programmes showed overlap across descriptive exposure

profiles, with several programmes, including Mickey Mouse Clubhouse, The Wiggles, Hi-5, and Blue's Clues, appearing in multiple profiles.

Table 3. Most frequently watched shows by content exposure profile

Frequency Rank	Neutral	High Prosocial	High Aggression	Co-Occurring
1	The Wiggles	Thomas the Tank Engine	SpongeBob SquarePants	Dora the Explorer
2	Hi-5	Bob the Builder	The Wiggles	Little Einsteins
3	Mickey Mouse Clubhouse	Blue's Clues	Hi-5	Handy Manny
4	In the Night Garden	Chuggington	Disney Toons	Fireman Sam
5	Blue's Clues	Mickey Mouse Clubhouse	Mickey Mouse Clubhouse	Mickey Mouse Clubhouse

Associations with Child and Family Background Characteristics

We next examined whether children's descriptive exposure profiles differed on sociodemographic characteristics. For continuous variables, analyses of variance (ANOVAs) with Bonferroni adjusted post-hoc comparisons were conducted. For categorical variables, chi-square tests were used. Effect sizes were used to guide inclusion of variables as covariates, with $\eta^2 \geq 0.01$ or $V \geq 0.20$ considered meaningful.

As shown in Table 4, using these effect size thresholds, exposure profiles differed significantly on socioeconomic deprivation, maternal education, and child sex, with the high aggressive exposure profile largely differing demographically from the remaining three groups. Profiles did not differ meaningfully in number of siblings or maternal ethnicity.

Table 4. Comparisons of sociodemographic characteristics based on exposure profiles at age 2

	Neutral [Mean (SD)] n=911	High Prosocial [Mean (SD)] n=302	High Aggression [Mean (SD)] n=525	Co- Occurring [Mean (SD)] n=685	Statistical Test
Socioeconomic deprivation	5.63 (2.91) ^a	5.69 (2.90) ^a	6.87 (2.89) ^b	5.77 (2.94) ^a	$F(3,2364) = 22.34, p < .001; \eta^2 = 0.03$
Maternal education	2.27 (1.09) ^b	2.23 (1.13) ^b	1.89 (1.16) ^a	2.13 (1.17) ^b	$F(3,2406) = 13.19, p < .001; \eta^2 = 0.02$
Number of siblings	1.75 (1.29)	1.88 (1.51)	1.95 (1.27)	1.76 (1.14)	$F(3,1539) = 2.15, p = .09; \eta^2 = 0.004$
Maternal ethnicity	67.11%	65.67%	46.64%	66.62%	$\text{All } X^2(3) < 70.25; \text{ all } V < .17$
	European	European	European	European	
	14.52%	18.00%	20.73%	21.81%	
	Māori	Māori	Māori	Māori	
	14.85%	12.33%	28.98%	15.08%	
	Pacific	Pacific	Pacific	Pacific	
Child sex	14.85%	16.00%	17.27%	12.59%	$X^2(3) = 124.23, p < .001; V = .22$
	Asian	Asian	Asian	Asian	
	59.82%	25.50%	50.67%	41.75%	
	Female	Female	Female	Female	
	40.18%	74.50%	49.33%	58.25%	
	Male ^a	Male ^d	^b	Male ^c	

Differing superscripts indicate significant within-row differences

Latent Growth Curve Models

We next examined associations between early television content exposure and children's developmental trajectories using continuous measures of aggressive and prosocial content, their interaction, and overall television viewing time. All models adjusted for neighborhood socioeconomic deprivation and maternal education. Table 5 provides the means and standard deviations for all variables included in the analysis as well as the correlations among these variables.

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Table 5. Descriptive statistics and intercorrelations among study variables.

Study Variable	Mean (SD)	AGG	PRO	TVT	CP2	PRP 2	PB2	CP4	PRP 4	PB4	CP8	PRP 8
Aggressive Content – Age 2 (AGG)	0.21 (0.38)	-										
Prosocial Content – Age 2 (PRO)	1.24 (0.38)	-0.13	-									
Television Viewing Time – Age 2 (TVT)	1.64 (1.35)	0.10	-0.00	-								
Conduct Problems – Age 2 (CP2)	3.21 (1.97)	0.11	0.00	0.19								
Peer Relationship Problems – Age 2 (PRP2)	2.24 (1.67)	0.10	-0.01	0.19	0.29	-						
Prosocial Behavior – Age 2 (PB2)	7.10 (1.84)	-0.03	-0.01	-0.05	-0.26	-0.22	-					
Conduct Problems – Age 4.5 (CP4)	1.95 (1.60)	0.05	-0.02	0.08	0.36	0.16	-0.16	-				
Peer Relationship Problems – Age 4.5 (PRP4)	1.61 (1.58)	0.10	-0.01	0.18	0.25	0.37	-0.12	0.26	-			
Prosocial Behavior – Age 4.5 (PB4)	7.75 (1.79)	-0.01	-0.05	-0.04	-0.14	-0.13	0.36	-0.29	-0.21	-		
Conduct Problems – Age 8 (CP8)	1.35 (1.44)	0.02	0.04	0.08	0.25	0.12	-0.12	0.39	0.18	-0.22	-	
Peer Relationship Problems – Age 8 (PRP8)	1.47 (1.63)	0.08	-0.01	0.16	0.18	0.24	-0.10	0.18	0.43	-0.12	0.35	-

8 (PRP8)												
Prosocial Behavior – Age 8 (PB8)	8.14 (1.83)	-0.01	-0.03	-0.04	-0.11	-0.15	0.25	-0.24	-0.20	0.41	-0.47	-0.31
Correlations of $r \geq 0.10$ are considered significant and bolded												

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Conduct Problems

The latent growth curve model for conduct problems demonstrated good fit to the data [$\chi^2(9) = 18.38, p = .03$; CFI = 0.994; TLI = 0.981; RMSEA = 0.016]. Results are provided in Table 6.

Exposure to aggressive content significantly predicted higher initial levels of conduct problems at age 2 ($\beta = 0.28, p = .007$), while exposure to prosocial content was not associated with conduct problems at age 2 ($\beta = 0.05, p = .56$). Total television viewing time was significantly positively associated with conduct problems at age 2 ($\beta = 0.18, p < .001$). No statistically significant associations were observed for the remaining predictors of baseline conduct problems (see Table 6).

Total television viewing time also predicted change in conduct problems over time, such that higher television viewing time was associated with a steeper decline in conduct problems across childhood ($\beta = -0.14, p < .001$). No other statistically significant associations were observed for predictors of change in conduct problems over time.

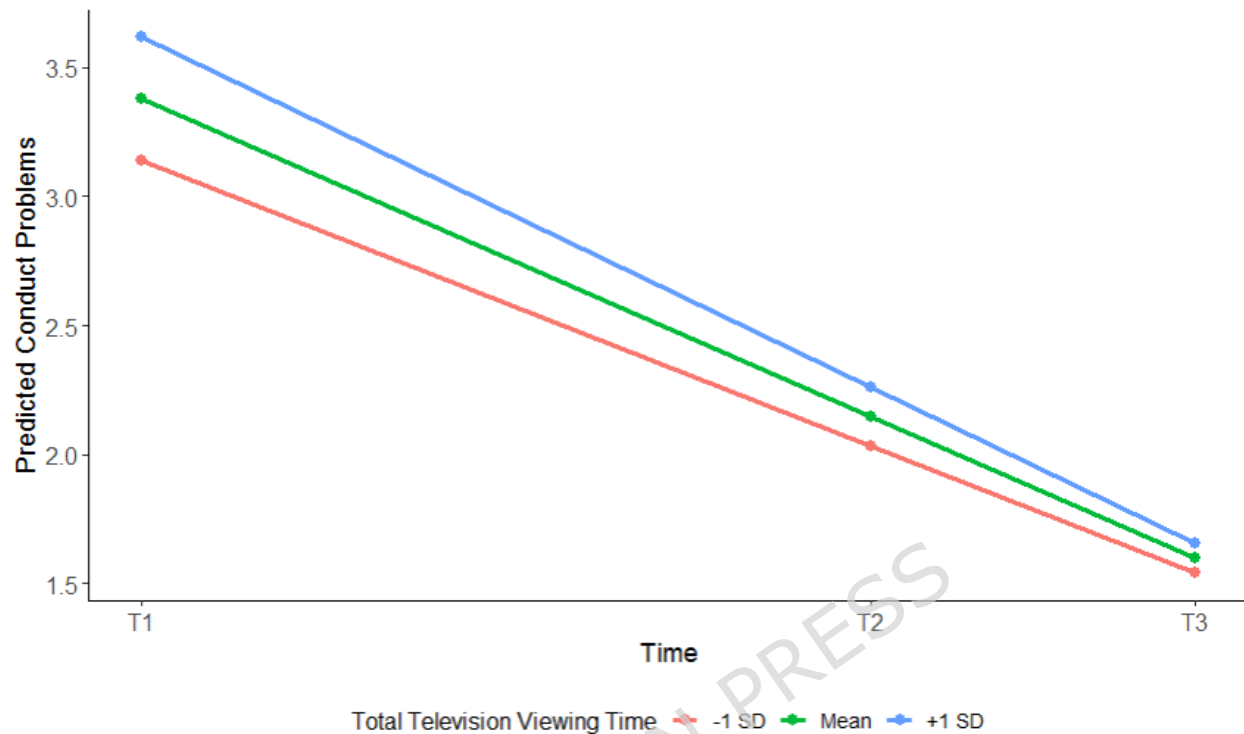
As shown in Figure 2, most of the decline in conduct problems occurs between ages 2 (T1) and 4.5 (T2), with less change observed between ages 4.5 and 8 (T3).

Table 6. Results of latent growth curve models

		Estimate (SE)	z-score	p-value	95% CI
Dependent Variable: Conduct Problems					
Intercept	Aggressive Content	0.28 (0.10)	2.69	0.007	0.08, 0.48
	Prosocial Content	0.05 (0.08)	0.58	0.56	-0.11, 0.21
	Aggressive X Prosocial	0.00 (0.33)	0.01	0.99	-0.65, 0.65
	Television Viewing Time	0.18 (0.02)	8.00	< 0.001	0.14, 0.22
	Aggressive X Television Viewing Time	0.01 (0.05)	0.10	0.92	-0.10, 0.11
	Prosocial X Television Viewing Time	-0.06 (0.06)	-0.91	0.36	-0.18, 0.06
Slope	Aggressive Content	-0.18 (0.13)	-1.42	0.16	-0.43, 0.07
	Prosocial Content	-0.07 (0.10)	-0.74	0.46	-0.27, 0.12
	Aggressive X Prosocial	0.26 (0.40)	0.64	0.53	-0.53, 1.05
	Television Viewing Time	-0.14 (0.03)	-4.93	< 0.001	-0.19, -0.08
	Aggressive X Television Viewing Time	-0.09 (0.07)	-1.30	0.19	-0.21, 0.04
	Prosocial X Television Viewing Time	0.01 (0.08)	0.14	0.89	-0.14, 0.16
Dependent Variable: Peer Relationship Problems					
Intercept	Aggressive Content	0.35 (0.09)	4.02	< 0.001	0.18, 0.52
	Prosocial Content	0.03 (0.07)	0.40	0.69	-0.11, 0.17
	Aggressive X Prosocial	0.45 (0.28)	1.62	0.11	-0.10, 1.00
	Television Viewing Time	0.17 (0.02)	9.06	< 0.001	0.13, 0.21
	Aggressive X Television Viewing Time	-0.06 (0.05)	-1.31	0.19	-0.15, 0.03
	Prosocial X Television Viewing Time	0.01 (0.05)	0.22	0.83	-0.09, 0.11
Slope	Aggressive Content	-0.11 (0.10)	-1.11	0.27	-0.31, 0.09
	Prosocial Content	-0.04 (0.08)	-0.44	0.66	-0.20, 0.12

	Aggressive X Prosocial	-0.28 (0.32)	-0.87	0.39	-0.92, 0.36
	Television Viewing Time	-0.04 (0.02)	-1.62	0.11	-0.08, 0.01
	Aggressive X Television Viewing Time	-0.02 (0.05)	-0.32	0.75	-0.12, 0.09
	Prosocial X Television Viewing Time	0.02 (0.06)	0.32	0.75	-0.10, 0.14
Dependent Variable: Prosocial Behavior					
Intercept	Aggressive Content	-0.01 (0.10)	-0.14	0.89	0.18, -0.00
	Prosocial Content	0.09 (0.08)	1.07	0.29	-0.07, 0.24
	Aggressive X Prosocial	0.25 (0.32)	0.78	0.44	-0.38, 0.87
	Television Viewing Time	-0.07 (0.02)	-3.34	0.001	-0.11, -0.03
	Aggressive X Television Viewing Time	0.06 (0.05)	1.08	0.28	-0.05, 0.15
	Prosocial X Television Viewing Time	0.04 (0.06)	0.63	0.53	-0.08, 0.15
Slope	Aggressive Content	0.01 (0.14)	0.10	0.92	-0.25, 0.28
	Prosocial Content	-0.10 (0.11)	-0.98	0.33	-0.31, 0.11
	Aggressive X Prosocial	-0.42 (0.43)	-0.97	0.33	-1.27, 0.43
	Television Viewing Time	0.02 (0.03)	0.52	0.60	-0.04, 0.07
	Aggressive X Television Viewing Time	0.02 (0.07)	0.27	0.79	-0.12, 0.16
	Prosocial X Television Viewing Time	-0.06 (0.08)	-0.72	0.47	-0.22, 0.10

Figure 2. Growth model of conduct problems at different levels of total television viewing time



Peer Relationship Problems

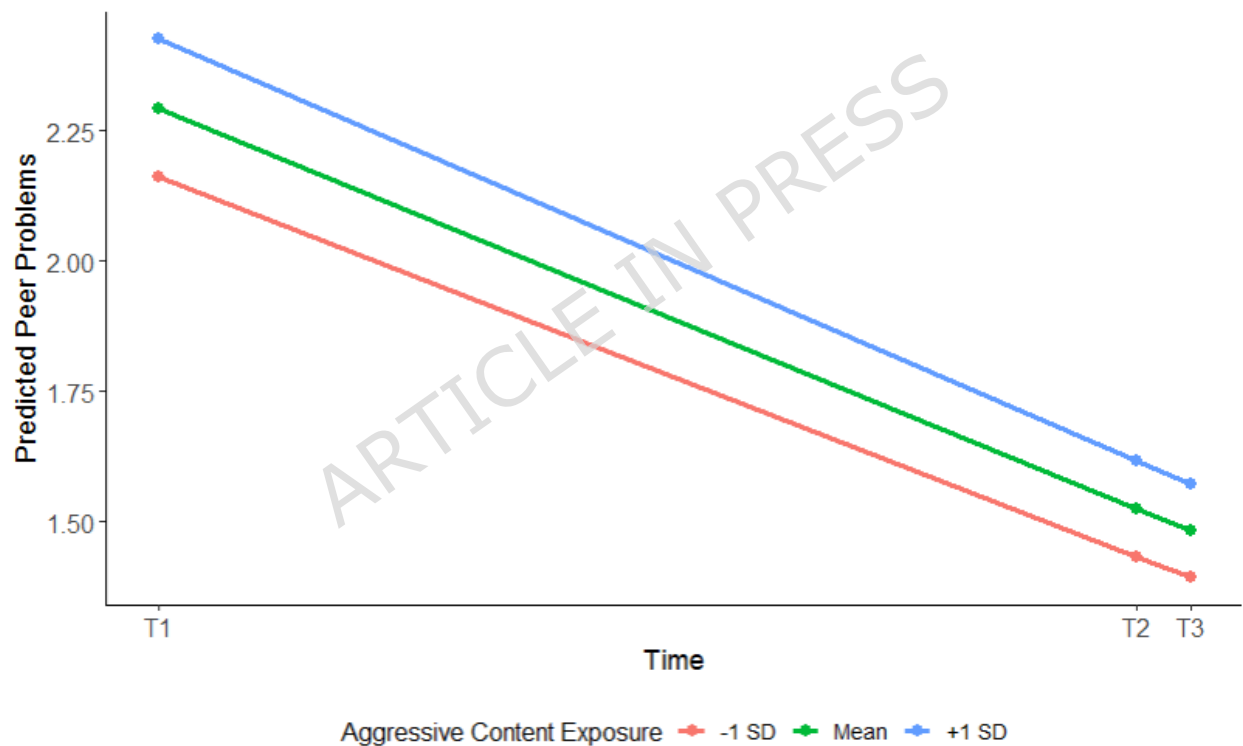
The latent growth curve model for peer relationship problems demonstrated good fit to the data [$\chi^2(9) = 9.89$ $p = .36$; CFI = 1.000; TLI = 0.999; RMSEA = 0.005]. Higher exposure to aggressive television content was associated with higher initial levels of peer relationship problems at age 2 ($\beta = 0.35$, $p < .001$), whereas exposure to prosocial content was not significantly associated with peer relationship problems at age 2 ($\beta = 0.03$, $p = .69$). Higher total television viewing time was associated with peer relationship problems at age 2 ($\beta = 0.17$, $p < .001$).

In contrast to conduct problems, there were no other statistically significant associations that were observed for predictors of change in peer relationship problems over time (see Table 6). As shown in Figure 3, although children with higher aggressive content exposure began with higher

levels of peer relationship problems at age 2, trajectories of change were similar across exposure levels.

As with conduct problems, peer relationship problems primarily declined between ages 2 (T1) and 4.5 (T2), with substantially less change observed between ages 4.5 and 8 (T3).

Figure 3. Growth model of peer relationship problems at different levels of aggressive content exposure



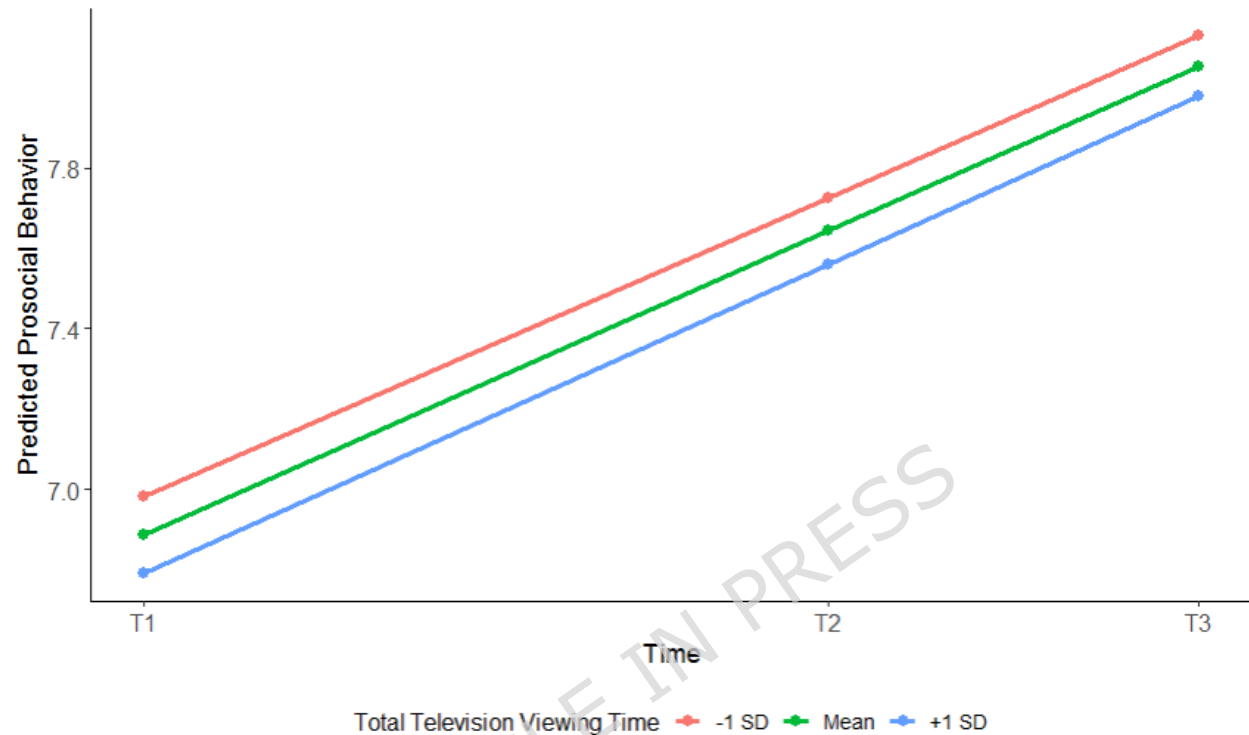
Prosocial Behavior

The latent growth curve model for prosocial behavior demonstrated good fit to the data [$\chi^2(9) = 13.72, p = .13$; CFI = 0.996; TLI = 0.987; RMSEA = 0.011]. Total television viewing time was the only statistically significant predictor of prosocial behavior at baseline ($\beta = -0.07, p = .001$),

with higher television viewing time associated with lower prosocial behavior. Exposure to aggressive content, prosocial content, and their interaction were not associated with initial levels of prosocial behavior at age 2 (see Table 6). No statistically significant associations were observed for predictors of change in prosocial behavior over time. Growth trajectories for prosocial behavior across levels of total television viewing time are shown in Figure 4.

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Figure 4. Growth model of prosocial behavior at differing levels of total television viewing time



Discussion

The present study examined whether early exposure to aggressive and prosocial television content at age 2, and the interaction between these content dimensions, was associated with children's social and behavioral development across early to middle childhood. Using longitudinal data from a large population-based cohort and fine-grained content coding of children's most frequently watched television programmes, we examined whether exposure to aggressive and prosocial content, modelled as continuous measures alongside their interaction and overall television viewing time, predicted children's initial levels and developmental trajectories of conduct problems, peer relationship problems, and prosocial behavior from ages 2 to 8. By focusing on both content quality and overall television viewing time simultaneously, this

study responds to calls within the media violence literature for more nuanced, developmentally sensitive analyses of early television exposure (Valkenburg & Peter, 2013; Zosh et al., 2023).

Across outcomes, a similar pattern emerged with respect to early exposure and developmental change. Children who were exposed to higher levels of aggressive television content showed higher levels of conduct problems and peer relationship problems at age 2. In contrast, exposure to prosocial television content was not associated with children's early conduct problems, peer relationship problems, or prosocial behavior. These findings suggest that early behavioral differences were evident at the point of which television exposure was assessed, but associations between early television content exposure and subsequent developmental change were limited after accounting for overall television viewing time. For peer relationship problems, higher early exposure to aggressive content was associated with elevated difficulties at age 2 that remained relatively stable across childhood. In contrast, for conduct problems, early differences associated with aggressive content exposure diminished over time. Across outcomes, no consistent associations were observed between early levels of exposure to aggressive and prosocial television content and developmental trajectories across childhood.

These findings are broadly consistent with meta-analytic evidence showing modest associations between media content and child behavior in early childhood (Coyne et al., 2018; Mallawaarachchi et al., 2024), while also refining this literature by clarifying how these associations may vary across development. Although prior reviews report significant links between exposure to aggressive and prosocial content and children's behavior, our results suggest that early television content exposure at age 2 was not strongly related to changes in children's behavior over time. Instead, differences observed at age 2 may reflect pre-existing

child and family characteristics or short-term behavioral responses, rather than longer-term developmental effects.

Importantly, the absence of longer-term associations in the current study does not imply that television content is not influential for children's development. Rather, it may reflect the developmental timing of exposure. At age 2, children's ability to understand the intent of characters, interpret social meaning, and learn from media content may still be emerging, which may limit how much television content shapes later behavior. As children grow older and develop stronger cognitive scripts and social understanding, they may be more likely to learn from and be influenced by media content (Buckley & Anderson, 2006). Accordingly, exposure to aggressive and prosocial television content at older ages may be more strongly related to children's behavioral development.

Early Associations and the Role of Child and Family Context

Associations between content exposure and children's behavior were evident at age 2 but largely absent from developmental change over time. Instead, total television viewing time emerged as the only predictor of change across outcomes, specifically a steeper decline in conduct problems among children with higher television viewing time. The finding that viewing quantity, rather than content quality, predicted developmental change adds an important layer to this interpretation. One plausible interpretation is that associations between television content and early behavior reflect selection effects rather than ongoing socialization. That is, children who already show higher levels of behavioral difficulties, or who grow up in certain family contexts (e.g., higher socioeconomic adversity), may be more likely to be exposed to television content containing higher levels of aggression. Viewing quantity may similarly reflect broader family patterns of media use, such that families with higher overall television viewing time may differ

from lower television viewing families on characteristics also associated with children's behavioral development. These sociodemographic patterns are consistent with selection effects interpretation, suggesting that contextual factors may shape both children's early television exposure and their behavioral development. Consistent with this, descriptive analyses showed that exposure patterns varied by family socioeconomic deprivation, maternal education, and child sex, highlighting the importance of contextual factors in shaping children's early television exposure.

This interpretation is consistent with the Differential Susceptibility to Media Effects Model (DSMM; Valkenburg & Peter, 2013) and the Dynamic, Relational, Ecological Approach to Media Effects Research (DREAMER Model; Barr et al., 2024), which emphasize that children's characteristics and environments shape both the media they are exposed to and their responses to it. From this perspective, exposure to aggressive television content at age 2 may act as a marker of early child or family characteristics, rather than a direct predictor of later behavioral change. Importantly, this pattern was observed across conduct problems and peer relationship problems. If early television content exposure had a lasting socializing effect, differences in children's behavior would be expected to widen over time. Instead, children showed largely similar patterns of developmental change across childhood, suggesting limited evidence that early content exposure shaped longer-term social-behavioral development in this sample of children.

Potential Explanations for Limited Long-Term Associations

Social learning (Bandura, 1973) and script theories (Buckley & Anderson, 2006; Huesmann, 1988) are often used to explain links between media exposure and children's behavior, suggesting that children learn behavioral patterns by observing and repeating what they see on screen. Experimental studies show that replacing violent or age-inappropriate content with

prosocial or educational programming can lead to short-term improvements in children's behavior (Mallawaarachchi et al., 2024). However, the present findings suggest that such effects, when exposure occurs very early in development, may be limited in duration and may not translate into longer-term developmental change across childhood.

One possible reason is that the aggression portrayed in young children's television programming may differ from the kinds of aggression most strongly linked to later behavioral outcomes. Many programmes rely on animated, fantastical, or humorous depictions of aggression and conflict, which may be less likely to be internalized as realistic behavioral scripts. The extent to which children learn from television likely depends on their developmental capacity to interpret media content, including their ability to perceive realism, identify with characters, and understand consequences of behavior (Huesmann & Kirwil, 2007). Preschool-aged children generally recognize cartoons as make-believe and can differentiate fictional worlds from real life, which may constrain the transfer of televised aggression and prosocial behavior to real-world behavior (Blumberg et al., 2008; Kirsh, 2006). Consistent with this, experimental studies of cartoon violence in early childhood have produced mixed findings, with effects more consistently observed for object-oriented play than for aggression, and primarily when violence is non-comedic or highly realistic (Kirsh, 2006). Together, this literature suggests that early exposure to animated or fantastical programming may differentiate children with existing behavioral vulnerabilities, particularly in highly scaffolded viewing environments such as the family home but may be insufficient to shape sustained changes in behavior over time.

An additional consideration is the developmental stage at which television exposure was assessed in the present study. At age 2, children's cognitive capacities for understanding narrative structure, causal relationships, and the consequences of characters' actions are likely

still emerging. Although toddlers may attend to salient actions or emotional cues, they may be less able to comprehend broader storylines or integrate moral messages in ways that support sustained behavioral change. As children's narrative comprehension, theory of mind, and moral reasoning develop, television content may become more meaningful and influential.

Accordingly, the absence of long-term associations in the present study does not rule out the possibility that media content exposure at later ages may be more strongly related to children's developmental trajectories. It is worth noting that content exposure was assessed based on the mean rate of aggressive and prosocial behaviors across children's most frequently watched television programmes, rather than the total time of exposure to specific content. From a script theory perspective (Buckley & Anderson, 2006; Huesmann, 1988), the frequency with which a behavioral script is encountered may be as important as its presence within programming. The inclusion of overall television viewing time and its interaction with content exposure in the present models represents a step toward addressing this, though the independent contribution of content-specific viewing time remains an important question for future research. Future research should also examine whether the developmental impact of media content varies across childhood and identify when children's cognitive processing of television content becomes more closely linked to behavioral outcomes.

Co-occurring Aggressive and Prosocial Content

A key contribution of this study is showing that children's television programming is rarely homogeneous in its social messaging. Many programmes contained both aggressive and prosocial behavior, highlighting the behavioral complexity of content commonly viewed by young children. By quantifying the co-occurrence of aggressive and prosocial behaviors within children's television programmes, this study builds on prior work (e.g., Holmgren et al., 2019)

by highlighting the moral and behavioral complexity of media content, while operationalizing this complexity in terms of observable aggressive and prosocial behaviors in the same episode rather than the intent underlying specific acts (which may not be easily understood at age 2).

Despite concerns that exposure to television content containing both aggressive and prosocial behaviors might send young children conflicting social learning messages, we did not observe statistically significant associations between the co-occurrence of aggressive and prosocial content was associated with children's social and behavioral outcomes. Specifically, prosocial content did not moderate associations between aggressive content exposure and children's initial levels or developmental trajectories of conduct problems, peer relationship problems, or prosocial behavior. This suggests that the presence of both aggressive and prosocial behaviors within early childhood television programming, in itself, was not associated with long-term social and behavioral outcomes in the present study.

One possible explanation is that young children may focus more on individual aggressive or prosocial behaviors as they occur, rather than integrating the co-occurrence of multiple types of behaviors within the same episode or across episodes in ways that meaningfully shape longer term behavior. Alternatively, family context and parental mediation may play an important role in shaping children's exposure to aggressive and prosocial television content. Prior research suggests that autonomy supportive parental monitoring is associated with lower exposure to violent content and greater exposure to prosocial content, particularly in older children and adolescents (Holmgren et al., 2019), highlighting the need for future research to examine how parental mediation and developmental stage jointly shape the impact of co-occurring aggression and prosocial television content.

Prosocial Television Content Exposure and Developmental Trajectories

Contrary to expectations based on previous research, exposure to prosocial television content at age 2 was not associated with higher initial levels or growth in prosocial behavior across childhood. Although meta-analytic evidence links prosocial media exposure to greater empathy and helping behavior (Coyne et al., 2018), much of this evidence comes from experimental studies, short-term outcomes, or samples of older children. In particular, experimental work demonstrating that children's prosocial behavior can be shaped through social modeling is typically conducted with preschool-aged children (e.g., around age 3-4; Williams et al., 2014), when children's social-cognitive capacities are more developed. The present findings suggest that exposure to prosocial television content at age 2 may be insufficient, on its own, to influence longer-term prosocial development.

This pattern highlights the importance of developmental context. Longitudinal research indicates that prosocial behavior reflects relatively stable individual differences that are shaped by a combination of temperamental predispositions, self-regulatory capacities, parenting practices, and broader socialization (Eisenberg et al., 1999). In early childhood, prosocial behavior may therefore be more strongly influenced by direct social interactions, caregiver modeling, and everyday opportunities for cooperation and helping than by observational learning from television alone. From this perspective, prosocial media may still support specific behaviors or skills in the short term, particularly when embedded within supportive social contexts, but may have limited impact on broader developmental trajectories when exposure occurs very early in development.

Implications for Parents and Public Health Guidance

These findings have implications for how guidance around children's television use is framed within a public health context. Although exposure to aggressive television content was associated with higher levels of conduct and peer relationship problems in early childhood, associations with behavioral change over time were limited after accounting for overall television viewing time. Likewise, exposure to prosocial television content at age 2 was not associated with long-term benefits for children's social behavior. Notably, overall television viewing time was associated with higher early conduct and peer relationship problems and lower prosocial behavior at age 2 and predicted a steeper decline in conduct problems across childhood, suggesting that television viewing quantity may be as relevant as content quality when considering early television use. Together, these results caution against overly deterministic interpretations of early television exposure. Importantly, the absence of long-term associations in the present study does not imply that exposure to age-inappropriate or aggressive television content is beneficial. Instead, the findings do not provide evidence of lasting developmental harm from early content exposure in this sample, though these findings should be interpreted cautiously given the limitations of the current study.

A more pragmatic approach may therefore be warranted, encouraging attention to both the amount and content of early television viewing, rather than focusing narrowly on promoting specific "prosocial" programmes. This perspective acknowledges the modest size of observed associations and the reality that media-related decisions made by parents are embedded within broader family contexts, values, and constraints. From a public health perspective, even modest associations may be meaningful at a population level when exposure is widespread, but guidance should remain proportionate and evidence-based.

Limitations

Several limitations should be considered. First, the observational design limits causal inference, and unmeasured child or family characteristics may explain associations between early television exposure and behavioral outcomes. Second, television exposure was assessed at a single time point and based on children's most frequently watched programmes, rather than detailed viewing duration, which may have reduced measurement precision. Third, the focus on television content limits generalizability to other forms of digital media, such as movies, YouTube videos, or interactive platforms. Furthermore, children's responses to media may depend on qualitative features such as realism, narrative framing, and perceived consequences. Although this study captured the frequency of aggressive and prosocial behaviors, it did not assess these qualitative features directly, which may be important moderators of television content effects. Fourth, all child behavioral outcomes were assessed using maternal report, which may be subject to response bias and may not fully capture children's behavior across different contexts. Future research would benefit from incorporating multiple informants, such as teacher report or observational measures, to provide a more comprehensive assessment of children's social and behavioral development.

Conclusions and Future Directions

Using longitudinal data from early to middle childhood, this study found that early exposure to aggressive television content was associated with higher initial levels of conduct and peer relationship problems at age 2 but was not associated with developmental trajectories over time. Overall television viewing time was associated with initial levels across all three outcomes at age

2 and predicted a steeper decline in conduct problems across childhood. Exposure to prosocial television content and its interaction with aggressive television content were not associated with children's social and behavioral development across childhood. These findings suggest that early television content exposure may reflect pre-existing child or family characteristics, though the present study found limited evidence of sustained associations with children's developmental trajectories, particularly after accounting for overall television viewing time.

Future research should aim to better disentangle selection and socialization processes by incorporating repeated assessments of media exposure across development, earlier measurement of child behavior, and greater attention to family context and parental mediation practices. Approaches that move beyond simple content categories to examine multiple dimensions of media exposure simultaneously may provide a more nuanced understanding of when and for whom television content influences child development. From this perspective, early television content exposure may mark early behavioral differences, while variation in content exposure at later developmental stages, or across multiple dimensions, may be more informative for understanding longer-term social and behavioral outcomes. Future research should also examine children's broader digital media diets including background television, short-form content, and interactive media, across multiple developmental time points.

Declarations**Abbreviations**

N/A

Ethics approval and consent to participate

This study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval for the study was granted by the Health and Disability Ethics Committee (HDEC), New Zealand Ministry of Health (NTY/08106/055), and written informed consent was obtained from all participating mothers. Study participants were informed about their right to withdraw at any stage of the study. Confidentiality and anonymity were ensured throughout the study. The present study involves secondary analysis of de-identified data collected under this approval.

Consent for publication

N/A

Availability of data and materials

The data analyzed in this study is subject to the following licenses/restrictions: access to the data used in this study can be obtained through application to the Growing Up in New Zealand team. Requests to access these datasets should be directed to <https://www.growingup.co.nz/>.

Competing Interests

The authors declare that they have no conflict of interest.

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Authors' contributions

Cara Swit: Funding acquisition, Conceptualization of Study, Methodology, Data collection, Writing – original draft, Writing – review & editing. **Megan Gath:** Funding acquisition, Conceptualization of Study, Methodology, Data collection, Statistical Analysis, Writing – review & editing. **Jenna Gawn:** Data analysis, Writing – review & editing. **Jennifer Smith:** Funding acquisition, Conceptualization of Study, Writing – review & editing. **Mia McLean:** Funding acquisition, Conceptualization of Study, Writing – review & editing. **Ying Wang:** Funding acquisition, Conceptualization of Study, Writing – review & editing.

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