



Factors Associated With Trajectories of Externalizing Behavior in Preschoolers

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ABSTRACT

OBJECTIVE: More media exposure and life stressors are associated with higher levels of externalizing behaviors in young children; however, their joint impact on externalizing behavior trajectory is unknown. This study assessed the relationship of stressful life events (SLE), media exposure, and additional demographic and family variables on the trajectory of externalizing behaviors in preschool-aged children.

METHODS: Participants were children ages 3 to 5 years from a large, 18-month duration, randomized control trial to reduce inappropriate media exposure. The sample was recruited from community pediatrics' practices. Intervention and control groups were collapsed, with study arm a covariate. Latent growth modeling (LGM) was conducted, with main outcome of externalizing behaviors at 6, 12, and 18 months after study initiation. Primary exposures of interest were total daily media hours, SLE, intimate partner violence, and harsh parenting.

RESULTS: Final analyses included 613 children. LGM without covariates revealed a significant decrease in mean externalizing

score between baseline and 18 months. LGM with covariates revealed that individuals with more media exposure exhibited more externalizing behaviors and SLE significantly predicted a slower decline in externalizing behaviors. Externalizing behavior at 18 months was significantly predicted by SLE, child age, white non-Hispanic race, and harsh parenting.

CONCLUSIONS: Exposure to a greater number of stressful life events appears to slow the age-appropriate decline in externalizing behaviors for preschool-aged children, while harsh parenting and media exposure are associated with more externalizing behavior. Findings highlight the importance of screening and surveillance in primary care and the need for early intervention efforts targeted to these risks.

KEYWORDS: externalizing behavior; harsh parenting; latent growth modeling; media exposure; stressful life events

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WHAT'S NEW

Externalizing behaviors decrease from toddlerhood to school age. More stressful life events slowed this decline. Both more media exposure and harsh parenting were also associated with more externalizing behaviors. Findings highlight the importance of targeted screening and intervention.

A GROWING LITERATURE indicates that exposure to stressful or traumatic life events is associated with increased behavior problems, including externalizing problems (ie, negative behaviors directed outside oneself, such as disruptive behaviors, aggression or bullying) in young children.^{1,2} This relationship has been found both with broad groups of stressors, such as the number of adverse

childhood experiences (ACEs)¹ and traumatic event exposures,³ as well as in studies of one or more stressful or traumatic experiences, such as community violence,² spanking,⁴ harsh parenting,⁵ parental stress,⁶ maternal depression,⁶ and increased time spent in poverty.⁷

Similarly, media exposure has also been implicated in behavioral outcomes of toddlers and preschool-aged children, both cross-sectionally and when considering past media exposure's impact on later behavior. Both independent TV viewing and background household TV exposure have been associated with increased externalizing behaviors even when variables such as parental education, family income, maternal mental health, and child temperament were controlled.^{6,8} Exposure to noneducational media content has also been associated with more aggressive behavior and general externalizing problems in 18-

month-olds,⁹ as well as in 21- and 33-month-olds despite appropriately controlling for potential confounders including maternal education, parenting program participation, maternal depressive symptoms and child temperament.⁸ Additionally, violent media exposure (ie, virtual violence) or age-inappropriate video watching (eg, PG-13 or R-rated) has been linked to aggressive behaviors,¹⁰ with substitution of prosocial or educational programming resulting in improved externalizing and prosocial behaviors, even when overall media exposure did not decrease.¹¹

Increasingly, studies are investigating influences on the trajectory of children's externalizing behaviors.^{5,12–14} In general, aggressive behavior decreases across time from toddlerhood to early school age, and persistent externalizing behaviors into school age have been associated with long-term mental health and behavioral challenges in adulthood.^{14–16} High-risk family environments (eg, maternal psychopathology, caregiver instability) and periods of family income loss have been associated with a plateauing of this normative decline in externalizing symptoms in the preschool years.¹² A reciprocal relationship between young child aggressive behavior and harsh discipline suggests that child behavior can influence caregiver behavior in ways that also alter the trajectory of child externalizing behaviors in a negative way.^{5,13}

Evidence suggests that more media exposure and life stressors are associated with higher levels of externalizing behaviors in young children; however, their joint impact on externalizing behavior trajectory is unknown. This study's objective was to use latent growth modeling (LGM) to investigate whether trajectories of externalizing behaviors in preschool-age children are altered by experiences of general stressful life events and media exposure. We hypothesized that these experiences could slow the typical reduction in externalizing behaviors seen across the preschool years.

METHODS

STUDY DESIGN AND POPULATION

Participants were part of a larger randomized controlled trial (RCT) of a media intervention to reduce exposure to age-inappropriate, violent media content by replacing it with more age-appropriate, educational or prosocial media (ClinicalTrials.gov Identifier: NCT01459835). Recruitment for this study has previously been described.¹¹ Child age ranged from 2.5 to 6.25 years over the course of this 18-month longitudinal study. Data collection for the current substudy was between March 2009 and October 2011, and final analyses and initial manuscript preparation occurred between November 2019 and April 2020. STrengthening the Reporting of OBservational studies in Epidemiology (STROBE) guidelines for reporting of observational studies were used for this manuscript. In brief, families were contacted through community pediatrics practices in Seattle and local surrounding communities and given the option to opt-out of or opt-in to further recruitment efforts. Those who neither opted out nor in were contacted by telephone regarding the

possibility of participating. Efforts to oversample low-income families were made by both identification of Medicaid status and by oversampling in low-income zip codes. For current analyses, with the exception of preliminary invariance assessments described in the analysis section, the intervention and control groups were collapsed, with study arm considered as a covariate (see below). All children who participated in the larger RCT were considered eligible.

OUTCOME

The outcome was the externalizing subscale of the 30-item Social Competence and Behavior Evaluation (SCBE-30). The SCBE-30 is a well-validated measure that, in its full form, contains an overall score, as well as externalizing, internalizing, and prosocial/social competence subscales. It can be completed by either the parent or teacher. For the current study, parents completed the SCBE-30. The SCBE-30 items are on a Likert scale ranging from 0 = never to 5 = always. The total possible score on the 10-item SCBE-30 externalizing subscale ranges from 0 to 50, with a higher score indicating more externalizing behaviors. Past studies with normative samples have shown externalizing subscale ranges between 15.5 and 26.5 across gender in the age range of study participants. The SCBE-30 was collected at each of 4 study time points; at study initiation (baseline) and 6, 12, and 18 months thereafter.^{17,18} Test-retest reliability in the initial tool validation at 2 weeks to 6 months after first administration ranged from 0.78 to 0.86.¹⁸ Test-retest reliability correlations in the current sample, with potential for longer time frame between assessments, ranged from $r = 0.58$ to $r = 0.77$ (all P 's < .001). Both the expected decreases in problem behavior in older children and consistency in factor structure across cultures have been reported.¹⁹

EXPLANATORY VARIABLES

There were 2 key exposure variables in our study: Media hours and stressful life events.

MEDIA HOURS

Total daily media hours at each time point were collected at baseline and 6-, 12-, and 18-month visits by detailed 1-week media diary. Prospective parent report of the child's media exposure was recorded, including television, digital video disk (DVD)/video, computer or video games. Details of media diary content and coding have been previously reported.¹¹ Total hours per day of media exposure were used in the current analyses. Hours of media exposure was the media-related focus of the current study, because the American Academy of Pediatrics explicitly recommends time limits in media exposure for children ages 2 to 5 years, with the statement being less strong regarding media content.²⁰

STRESSFUL LIFE EVENTS SCALE

The stressful life events scale was developed after review of several general life event and traumatic life

event scales and with strong consideration of the Psychosocial and Environmental Stressors Checklist of the Diagnostic Classification of Mental Health and Developmental Disorder of Infancy and Early Childhood-Revised (DC:0-3R). The 25-item list was collected at 12 months and contained a breadth of potentially stressful experiences adapted from established pediatric life events scales, trauma screeners or the DC:0-3R Psychosocial and Environmental Stressors Checklist (Table 1). Neither parents nor children were asked whether events were experienced as positive or negative by the child (eg, starting or changing preschool may be fun and exciting [positive] for some children and fearful and anxiety provoking [negative] for others). All events were life transitions or traumas and thus considered stressful.^{21–26} Life events scales do not assess an underlying construct/constructs, so subfactors or categories were not considered separately. Parents were asked at the 12-month visit to endorse “Yes” or “No” for whether each of the 25 events had “occurred within your family . . . at some point in your child’s lifetime.” Higher scores indicate more stressful life events reported.

COVARIATES

All covariates were collected at the baseline visit. The study arm to which the child was randomized was not a predictor of interest in the current analysis, but was included as a covariate to adjust for intervention effects. Other covariates included the demographic characteristics of age (in months) at study entry, gender (coded as

0 = boy, 1 = girl), race/ethnicity (coded as 1 = white, non-Hispanic or 0 = other) and low-income status (coded as 1 = low income—if household income was 200% below Federal Poverty level for 2009 or 0 = not low income—if this was not the case), and caregiver completing the study documents (coded as 1 = mother, 0 = father or other caregiver). Other covariates included a parent report of intimate partner violence (IPV; ie, ever pushed, shoved or slapped; coded as 0 = never, 1 = ever) directed at them or toward another by them at the first study time point and experience of harsh parenting prior to study participation. For harsh parenting, a composite score was calculated by assigning 2 points if the parent reported hitting the child on the bottom with an object like a belt or hairbrush or if they noted swearing or cursing at the child and one point if the parent reported spanking the child on the bottom with a bare hand. The full range of the harsh parenting composite was 0 to 5.

STATISTICAL ANALYSIS

One-way frequency tables for all variables and measures of central tendency and variability were generated for continuous variables. We also conducted an assessment of factorial invariance of the SCBE-30 items across time points and study arms to ensure that we could perform unbiased comparisons of SCBE scores across in our substantive models.²⁷ To assess the invariance of the SCBE-30, we fitted 4 successively restrictive nested single-factor confirmatory factor analysis (CFA) models: 1)

Table 1. Lifetime Experience of Stressful Life Events (n = 543)

Question	n (%)
1. Your child started or changed preschool/school	422 (77.7)
2. You/your partner was pregnant or had a miscarriage.	184 (33.9)
3. Your/your partner gave birth or a new child was adopted or fostered in the home.	185 (34.1)
4. You and your partner argued more than usual or there was a major conflict between family members.	171 (31.5)
5. A family member or important person to the family died.	187 (34.4)
6. A family member had serious medical problems.	198 (36.5)
7. A parent obtained a job.	332 (61.1)
8. A parent lost a job, had serious problems at work or was unable to find a job when needed.	104 (19.2)
9. Your family had financial problems.	96 (17.7)
10. You and your partner separated or divorced.	32 (5.9)
11. A parent had serious legal problems or had to go to jail.	18 (3.3)
12. A parent got married or remarried.	20 (3.7)
13. Another adult or family member moved into home.	62 (11.4)
14. Your child was separated from a parent or another important person for an extended time or under stressful circumstances.	32 (5.9)
15. Your family moved.	163 (30.0)
16. A family member had drug or alcohol problems.	30 (5.5)
17. Your child either saw or was in a serious accident where someone could have been or was seriously injured or died.	19 (3.5)
18. Your child saw people threatening to harm each other, fighting, hitting, pushing or attacking each other (in person, not on television or in a movie).	40 (7.4)
19. Your child saw someone threatened or injured with a weapon like a knife or a gun (in person, not on television or in a movie).	5 (0.9)
20. Your child was seriously ill, requiring treatment in the emergency department or necessitating overnight hospitalization.	130 (23.9)
21. Your child witnessed the use of drugs or misuse of alcohol or drugs.	10 (1.8)
22. Your child experienced a <u>major</u> natural disaster such as an earthquake, tornado or hurricane.	6 (1.1)
23. A parent or significant adult in your child’s life was diagnosed with a mental illness or was hospitalized due to psychiatric difficulties.	22 (4.1)
24. Your family was unable to get things it needed like enough food or safe housing.	14 (2.6)
25. You or someone else you know were beaten, attacked, or really hurt by others.	8 (1.5)

configural invariance (ie, For each group and time point, do the items indicate support for a single latent externalizing behaviors factor?); 2) metric invariance (ie, Are factor loadings equal across groups and time?); 3) scalar (strong) invariance (ie, Are factor loadings and item intercepts equal across groups and time?); and 4) strict (residual) invariance (ie, Are factor loadings, item intercepts, and residual item variances equal across groups and time?).

Following invariance assessment, LGM, a type of structural equation modeling, was used to estimate mean trajectories in externalizing behavior over time.²⁸ LGMs are similar to multilevel or hierarchical linear models in that they model trajectories using random intercepts and slopes, but allow for evaluating the overall fit of the model to the data.²⁹ In this study, invariance CFA models and LGMs were estimated using the latent variable modeling program *Mplus* version 8 via maximum likelihood estimation with robust standard errors (*Mplus* estimator MLR). Overall fit of LGMs to the data was assessed using the chi-square test of exact model fit; *P* values for this test exceeding .05 indicate that the null hypothesis of exact model-data fit cannot be rejected. Because the chi-square test is sensitive to trivial departures from perfect fit,³⁰ we also report the following approximate, descriptive fit statistics: the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR).³¹ Following Hu and Bentler's recommendations,³¹ a model was determined to fit well on an approximate basis if $RMSEA \leq .06$ and $SRMR \leq .08$. For invariance assessments, we considered whether each CFA model fitted the data well on an approximate basis and whether the change in RMSEA ($\Delta RMSEA$) and SRMR ($\Delta SRMR$) exceeded literature-recommended thresholds of .001 for RMSEA³² and .015 for SRMR, which would indicate noninvariance.

As recommended by Muniz-Terrera et al (2012),³³ an initial LGM without covariates was first fitted to the externalizing subscale totals at each of the 4 time points to obtain an estimate of the average trajectory of externalizing behavior over time and the participant variability in externalizing behavior trajectories. The slope effect was coded to represent a linear change in externalizing behaviors over time. Next, we added media hours and stressful life events exposures and the covariates listed above to the LGM to identify which of these variables significantly predicted change in externalizing behaviors over time. Because media hours is a time-varying exposure, we followed the approach of Muniz-Terrera et al (2012)³³ to decompose its overall effect into a within-person subcomponent and a between-person component. Decomposition of the media hours variable enabled us to address 2 research questions: 1) What is the effect of media hours on externalizing behaviors at each measurement occasion (within-person effect) and 2) Do individuals with higher than average media hours also have higher than average externalizing behaviors (between-person effect)? Finally, the LGM was refitted with the slope recoded to examine the effects of the time-constant 12-month stressful life events variable and baseline covariates on externalizing

behaviors at the final (18-month) time point.³⁴ Cases with incomplete data were included in the model via full information maximum likelihood (FIML).³⁵ All effects were evaluated for statistical significance at $\alpha = .05$.

ETHICS

The main study was approved by the Institutional Review Board of Seattle Children's Hospital. Approval for the current analyses was additionally obtained from the University of California San Francisco Institutional Review Board.

RESULTS

Six hundred twenty families participated in the original RCT study (see Christakis 2013 for study flow diagram).¹¹ Of these, 7 were removed because the family had not completed the outcome measure at any of the 4 time points, resulting in a total sample of 613 preschoolers and their families. Demographics of the study sample are shown in Table 2. The reporting caregiver was the child's mother in 87% of cases. Only 1.5% of participant families had experienced none of the queried stressful life events. Almost 91% had experienced at least one of the queried events, and 47.3% experienced 4 or more of the queried stressful life events in their child's lifetime. Of the 613 participants, 589 (96%) had SCBE-30 outcome data at baseline, 552 (90%) had SCBE-30 data at 6 months, 519 (85%) had SCBE-30 data at 12 months, and 523 (85%) had SCBE-30 data at 18 months. Covariate data were mostly complete: most covariates had less than 5% missingness, except for stressful life events ($N = 543$; 89% complete) and media exposure at 12 months ($N = 522$; 85% complete).

SCBE-30 INVARIANCE ASSESSMENT

The single-factor configural invariance model exhibited satisfactory approximate fit ($RMSEA = .044$; $SRMR = .067$). As shown in Table 3, successively restricted nested invariance comparison models did not appreciably worsen model-data fit and indicated support for metric ($RMSEA = .043$; $SRMR = .071$; $\Delta RMSEA = .001$; $\Delta SRMR = .004$), scalar ($RMSEA = .044$; $SRMR = .071$; $\Delta RMSEA = .001$; $\Delta SRMR = 0$), and strict ($RMSEA = .045$; $SRMR = .077$; $\Delta RMSEA = .001$; $\Delta SRMR = .006$) invariance. Taken collectively, our results support the conclusion that the SCBE-30's measurement of externalizing behaviors is invariant across study arms and time, allowing comparison of SCBE scores in the latent growth models described below.

LATENT GROWTH MODEL WITHOUT EXPOSURES AND COVARIATES

The chi-square test of exact fit rejected the null hypothesis of exact model-data fit: chi-square ($N = 613$, $DF = 8$) = 19.42, $P = .01$. However, the LGM fit the data very well on an approximate basis: $RMSEA = .05$ and $SRMR = .06$. The excellent fit supports treating the effect of time as linear. The baseline mean of externalizing behaviors

Table 2. Study Sample Characteristics (n = 613)

Child Characteristic	n (%) or Mean (SD)
Male	336 (54.8)
Age in months	51.3 (7.8)
Race/ethnicity	
White, non-Hispanic	396 (64.6)
White, Hispanic	17 (2.8)
Black	36 (5.9)
Asian/Pacific Islander	41 (6.7)
Native American/Alaska Native	3 (0.5)
Mixed race	69 (11.3)
Other/unreported	51 (8.3)
Low-income family	122 (19.9)
Harsh parenting composite (0–5)	0.9 (1.2)
Lifetime stressful life events	4.6 (2.6)
Total average daily media minutes	
Initial visit	72.8 (49.6)
6 months	86.8 (60.8)
12 months	79.9 (55.7)
18 months	80.6 (54.7)
Social Competence and Behavior Evaluation (SCBE-30) externalizing subscale	
Initial visit	14.2 (4.9)
6 months	14.1 (5.1)
12 months	13.7 (5.4)
18 months	13.1 (5.2)

SD indicates standard deviation.

was 14.31 (95% confidence interval [CI] = 13.93, 14.69; standard deviation [SD] = 4.22), $P < .001$, and the average change from baseline to 18 months was $B = -0.43$ (95% CI = -0.55, -0.30; SD = 0.29), $P < .001$, indicating a decrease in externalizing behaviors as children aged.

LATENT GROWTH MODELS WITH EXPOSURES AND COVARIATES

The latent growth model including media hours and SLE exposures and covariates yielded chi-square test of exact fit that rejected the null hypothesis of exact model-data fit: chi-square (N = 613, DF = 74) = 141.79, $P < .001$. However, the approximate fit criteria (RMSEA = .04 and SRMR = .03) indicated the LGM fitted the data satisfactorily. The estimated intercept of externalizing behaviors was 13.77 (95% CI = 10.83, 16.70; SD = 3.97), $P < .001$, and the estimated intercept of change from baseline to 18 months was 0.11 (95% CI = -0.91, 1.13; SD = 0.87), $P = .84$. Comparing these results to those from the LGM without covariates shows that while the intercept value changed little, the average slope value changed substantially and

was no longer statistically significantly different from zero. This suggests that the exposures and covariates explained the majority of the variance in externalizing behaviors previously attributable to change over time.

Turning to the effects of specific exposures and covariates on externalizing behaviors, the within-person effect for media hours was not statistically significant ($B = -.001$; 95% CI = -.005, .002; $P = .50$), indicating we found no evidence that changes in media hours were associated with changes in externalizing behaviors over time. However, the between-person effect for media hours was statistically significant ($B = .011$; 95% CI $\leq .001$, .022; $P = .044$), suggesting that individuals who have higher than average media hours exposure throughout the study also have higher than average amounts of externalizing behaviors.

As shown in Table 4, the only statistically significant time-constant predictor of change in externalizing behaviors from baseline to 18 months was stressful life events ($B = .06$; 95% CI = .01, .12; $P = .02$), with a slower decline in externalizing behaviors for children who experienced a higher number of stressful life events.

Table 3. SCBE-30 Externalizing Subscale Invariance Comparisons (N = 613)

Model (M): Invariance	M1: Configural	M2: Metric	M3: Scalar	M4: Strict
Chi-square (df)	2158.80* (1348)	2223.45* (1411)	2346.22* (1474)	2486.54* (1544)
RMSEA (90% CI)	.044 (.041, .048)	.043 (.040, .047)	.044 (.041, .047)	.045 (.041, .048)
SRMR	.067	.071	.071	.077
Comparison model	—	M1: Configural	M2: Metric	M3: Scalar
Δ chi-square (Δ df)	—	70.181 (63)	125.00* (63)	133.51* (70)
Δ RMSEA	—	.001	.001	.001
Δ SRMR	—	.004	0	.006

CI indicates confidence interval; RMSEA, root mean square error of approximation; and SRMR, standardized root mean square residual.

* $P < .001$.

Table 4. Latent Growth Model Results for Time-Constant Predictor Variables (N = 613)

		Regression Coefficients			
Outcome	Explanatory Variable*	B	95% CI	β	P
Intercept	Stressful life events	0.32	0.12, 0.52	0.17	.002
	Intervention exposure	-0.48	-1.31, 0.35	-.05	.26
	Child age (months)	-.09	-0.14, -.03	-0.14	.003
	Female gender	-.05	-0.88, 0.78	-.01	.91
	White, non-Hispanic race/ethnicity	1.52	0.62, 2.42	0.15	.001
	Caregiver (mother or father/other)	-0.34	-1.71, 1.03	-.02	.63
	Low income	-0.69	-1.78, 0.41	-.06	.22
	Harsh parenting	0.63	0.26, 1.01	0.15	.001
	Intimate partner violence at baseline	0.61	-0.68, 1.90	.04	.36
	Constant (intercept's intercept)	14.34	10.95, 17.72	—	<.001
Slope	Stressful life events	.06	.01, 0.12	0.18	.02
	Intervention exposure	-0.13	-0.37, 0.12	-.07	.32
	Child age (months)	-.02	-.03, .001	-0.14	.07
	Female gender	0.23	-.02, 0.48	0.13	.07
	White, non-Hispanic race/ethnicity	.06	-0.22, 0.33	.03	.68
	Caregiver (mother or father/other)	-.01	-0.46, 0.44	-.002	.98
	Low income	-0.20	-0.53, 0.12	-.09	.23
	Harsh parenting	-.03	-0.15, .09	-.04	.60
	Intimate partner violence at baseline	-0.22	-0.59, 0.16	-.08	.26
	Constant (slope's intercept)	0.11	.09, 0.13	—	.84
		Residual Variance Components			
Variable	Variance	95% CI		P	
Intercept	20.08	16.24, 23.91		<.001	
Slope	0.76	0.35, 1.16		<.001	
Intercept-slope covariance	1.85	0.78, 2.92		.001	
Externalizing	6.93	6.05, 7.80		<.001	

CI indicates confidence interval.

B is the unstandardized regression coefficient.

β is the standardized regression coefficient.

Slope is coded so that the intercept represents the final time point; therefore, effects in this table for the intercept represent the effects of time-constant covariates on externalizing behavior at 18 months. Findings regarding the time-varying exposure of media hours are presented in the text.

*Stressful life events were collected at 12 months; all other covariates were determined or collected at the baseline visit.

Statistically significant predictors of higher externalizing behaviors at 18 months were more stressful life events ($B = 0.32$; 95% CI = 0.12, 0.52; $P = .002$), younger child age ($B = -.09$; 95% CI = -0.14, -.03; $P = .003$), white, non-Hispanic race/ethnicity ($B = 1.52$; 95% CI = 0.62, 2.42; $P = .001$), and harsher parenting ($B = 0.63$; 95% CI = 0.26, 1.01; $P = .001$). These findings indicated that reports of more stressful life events; younger age; white, non-Hispanic race/ethnicity; and harsher parenting experiences were associated with more externalizing behaviors. Collectively, the predictors accounted for 12% of the variance in externalizing behaviors at the final time point and 8% of the variance in the change in externalizing behaviors over time. These are between benchmarks for small (2%) and medium (13%) standardized effects, tending towards medium.³⁶

DISCUSSION

Consistent with past literature, the LGM without covariates showed a significant decline in externalizing

behaviors as children age. Adding exposures and covariates to the LGM accounted for this decline. Since the slope of externalizing behaviors was no longer statistically significant after including exposures and covariates, our results suggest that our exposures and covariates fully explained the decline in externalizing behaviors over time.

Specifically in the LGM with exposures and covariates, only the number of stressful life events a child experienced in their lifetime was significantly related to the trajectory of their externalizing behaviors over time, with a slower decline in externalizing behaviors the more stressful life events a child experienced. A higher number of stressful life events, younger child age, harsher parenting, and being of white, non-Hispanic race/ethnicity were all associated with more externalizing behaviors at the 18-month time point.

Findings that stressful life events were associated with both the intercept and slope of externalizing behaviors lend support to a growing body of literature on the impact of trauma and stress on child behavior.¹⁻⁷ It is important

to emphasize that the stressful life events experienced by children in this study are common experiences and may be easily considered low risk. In fact, none of the 10 most commonly endorsed events in the scale are on the list of ACEs. Despite this, the co-occurrence of multiple stressful life events was associated with negative behavioral outcomes and slowing of age-appropriate reductions in externalizing behavior. Given the noted reciprocal and transactional relationship between parenting style (eg, harsh parenting) and child externalizing behaviors,^{5,13} these findings highlight the importance of clinicians attending to stressful life events experienced by preschoolers even in absence of evidence about event severity, particularly in children for whom externalizing behaviors are a concern.

For media exposure, results support previous literature, finding that children with more media exposure had higher levels of externalizing behavior throughout the study age ranges; however, no previous literature investigating the relationship between media exposure and externalizing behaviors over time was found. In the current dataset, no such relationship was detected. This may in part be that our study was unable to detect the degree of change in media exposure that would yield changes in externalizing behaviors. Alternatively, the presence of between-person effects without within-person effects may indicate a lack of direct causal linkage between media exposure and externalizing in the current dataset. For instance, perhaps one or more third variables could affect both media exposure and externalizing behaviors, thereby inducing correlation between media exposure and externalizing behaviors. Given the inability to randomize to exposures like media, causality is challenging to infer in any case. Current findings do suggest that decomposition of within-person and between-person effects should be considered in future studies of media exposure and child behavior to help clarify this relationship.

Additionally, this sample showed relatively low levels of background media exposure (1.2–1.5 hours per day) compared to a national sample of 2- to 4-year-olds (2.7 hours per day) and a national sample of 3-year-olds from 20 US cities (mean 3.2 hours per day).^{6,37} Total daily media exposure averaged below the recommended American Academy of Pediatrics guidelines at the time of data collection.³⁸ The sample also showed somewhat lower externalizing behavior subscale scores than in the SCBE-30 validation samples (current sample 13.1–14.2 vs validation samples 15.5–26.5).^{17,18} For children with more media exposure (eg, more than 2 hours per day), this variable may have a stronger relationship with externalizing behaviors. In fact, poorer self-regulation in infancy has been associated with small increases in media exposure in toddlers, perhaps due to parental needs for coping with a dysregulated child.³⁹ This relationship will be important to consider in future efforts to reduce media exposure, as well as when considering interventions that may support parents in stressful situations to use less harsh parenting techniques. Overall, findings of the current study suggest that future investigations should consider both the amount

of media exposure and its impact over time, and that clinicians should ask about media exposure hours in addition to stressful life events for all children with externalizing behavior in the preschool age range and continue to educate families about current recommended media guidelines.

Finally, this study reinforces previous findings that harsh parenting is associated with higher levels of externalizing behaviors in preschoolers,^{4–6} although associated changes in the trajectory of externalizing behavior were not detected. Previous literature suggesting that improving maternal responsiveness can enhance child self-regulation and reduce child aggressive behaviors suggests a potential intervention to break the cycle of parental harsh discipline and child aggressive behaviors.¹³ This study also contributes to the literature by demonstrating that the SCBE-30 measure of externalizing behaviors was invariant across study arms and time, rendering it a useful measure of externalizing behaviors in longitudinal research settings.

LIMITATIONS

The stressful life events scale was developed specifically for this study, which already included questions regarding the presence of IPV at study initiation and the harsh parenting scale. Thus, IPV and harsh parenting were separate from the stressful life events tool. If included, these may have further strengthened relationships between stressful life events and externalizing behaviors. Having these as stand-alone questions may have also contributed to the null finding with regard to IPV. Events scales are not expected to measure an underlying construct or constructs, so no analysis was completed on potential factors or clusters of events. Item level analyses were also not completed, since individual events were not the focus of this project, and no data were available on event perceived severity or valence (positive vs negative). Future work may wish to investigate individual items in more detail. Additionally, as technology advances at a rapid pace, the landscape of media use in preschool-aged children is constantly changing, as are recommendations from organizations such as the American Academy of Pediatrics, which recommended less than 2 hours of media use per day at the time of this study and now recommends one hour or less per day.^{20,38} As with any longitudinal study, some participants were lost to follow-up. Our analyses used FIML estimation to include cases with and without complete data, enabling us to draw inferences to those who did not finish the study as well as those who did. FIML is superior to methods such as listwise or case-wise deletion which only analyze cases with complete data at all waves. However, the FIML method assumes a conditionally missing-at-random (MAR) mechanism for missing data, which is often reasonable in longitudinal settings where including observed values from previous measurement times and covariates can help the analysis meet the MAR assumption.⁴⁰ Nonetheless, the MAR assumption is not testable and must still be assumed. Finally, the full study relies on parent-report of all variables without independent verification through teacher-

report or other formats. While inaccurate reporting may occur, for example of socially less-desirable behaviors, this is unlikely to impact study findings regarding externalizing behavior trajectories over time. Finally, only media hours was time-varying, with all other explanatory variables being measured at one time point only. This precluded decomposition into within and between subject effects for variables other than media hours. Future work may wish to explore these variables in a time-varying fashion as well.

CONCLUSION

This study supports previous findings that externalizing behaviors decrease as preschoolers age and suggests that this decline may be slower in children who experience stressful life events. Moreover, individuals with more media exposure had greater levels of externalizing behaviors. Additionally, the level of externalizing behavior at study end was positively related to White, non-Hispanic race/ethnicity and the harshness of parenting. Combined with evidence suggesting that new onset of aggressive behaviors rarely occurs after early school age and that interventions have the potential for greater impact at younger ages,^{41–44} these findings highlight the importance of early screening for life stressors and media exposure, as well as referral to and support for early interventions that address both family and child behavior factors. As screening for ACEs increases, with some states implementing reimbursement for this screening, these findings also highlight the importance of monitoring for the accumulation of seemingly less severe stressors, which may also impact child behavior, and in turn may negatively influence caregiver parenting practices^{5,13} and increase the child's risk for a host of negative outcomes in adolescence and adulthood.^{14–16}

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