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Parsing dimensions of family violence exposure in early childhood: Shared and specific contributions to emergent psychopathology and impairment

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ABSTRACT

Early childhood exposure to family violence predicts increased risk for psychopathology. However, violence between partners and towards children often co-occur. This complicates efforts to determine how experiences of family violence contribute to early mental health problems. Utilizing mother-report data on harsh parenting and intimate partner violence (IPV) from two large community-based, socioeconomically and ethnically diverse samples of 3–5-year-old children, we illustrate the value of a bifactor method for characterizing a family climate in which verbal and physical violence are more chronic and pervasive among family members. In our Calibration sample ($N = 1,179$), we demonstrate the fit of a bifactor model with a shared violence factor reflecting violence among partners and towards children and orthogonal factors for physically harsh parenting and IPV. Examination of item distributions along quartiles on the identified factors reveals that violent behaviors are most frequent/chronic in families with high scores on the shared violence factor. Next, we apply this model in Validation ($N = 1,316$) and lab-visit samples ($N = 369$). Children's symptoms and impairment showed relatively strong and consistent associations with the shared factor. Some unique associations with IPV and harsh parenting were also observed. Overall, patterns suggest particularly negative impact when verbal and physical violence are more chronic and pervasive among family members. Finally, evidence supporting the bifactor model's validity relative to multi-method data from coded interviews about child abuse and IPV and observed parenting is presented. Findings illustrate the value of a bifactor approach for the meaningful characterization of shared and specific features of family violence.

1. Introduction

A substantial portion of children are exposed to violence within their families, as direct victims or as witnesses, and this risk is disproportionately high in early childhood (Fantuzzo & Fusco, 2007; Finkelhor, Ormrod, & Turner, 2009; Wildeman et al., 2014). Violence exposure increases young children's risk for subsequent violence exposure (Grasso, Dierkhising, Branson, Ford, & Lee, 2016)

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and for psychopathology and impairment across the lifespan (McLaughlin, 2016). The adverse effects of family violence can be identified even in very young children (Briggs-Gowan, Carter et al., 2010; Briggs-Gowan, Carter, & Ford, 2012; Graham-Bermann, Castor, Miller, & Howell, 2012; Koolick et al., 2016). However, our understanding of why some children are adversely affected by violence exposure and others are not remains limited (McLaughlin, 2016). One explanation may be that prior work has not captured important aspects of the true variation in children's experiences of violence (Layne, Briggs, & Courtois, 2014).

Important research has focused on the effects of severity and chronicity of partner and family violence on children (Grasso, Henry, et al., 2016; Jackson, Gabrielli, Fleming, Tunno, & Makanui, 2014; Litrownik et al., 2005; Manly, Kim, Rogosch, & Cicchetti, 2001). A *family climate* where violence between partners and towards children is more chronic, qualitatively severe, and pervasive may also be particularly harmful early in development. Such a climate may affect children by disrupting caregiving systems and routines that are central to the development of self-regulation, as well as through their direct experiences as witnesses and victims. Capturing this violent family climate and the relationships in which violence manifests (partner, parent-child) may offer nuanced information about early exposure that will have implications for prevention and intervention. In this study, we test the utility of a bifactor model for characterizing these three facets of violence: *shared family violence*, a latent factor derived across items that describe violent partner and child-directed behaviors that vary in qualitative severity and frequency/chronicity, and orthogonal factors reflecting *partner violence* and *harsh parenting*. Our purpose is to illustrate the contribution of this bifactor modeling approach for characterizing key facets of violence experienced by young children.

By 5 years of age, an estimated 6% of children have experienced documented maltreatment and up to 20% have witnessed family violence (Briggs-Gowan, Ford, Fraleigh, McCarthy, & Carter, 2010; Finkelhor, Turner, Ormrod, & Hamby, 2009; Wildeman et al., 2014). Less severe forms of child-directed violence, such as spanking and other types of corporal punishment, are far more prevalent. An estimated 65% of preschool-age children were spanked in the past month and 70–94% were spanked in the past year (Straus & Stewart, 1999; Taylor, Lee, Guterman, & Rice, 2010; Zolotor, Theodore, Runyan, Chang, & Laskey, 2011). Although derived from a small number of representative samples, these findings converge to show that violent behaviors are prevalent in families with young children. Moreover, violent behaviors among partners and directed towards children often co-occur in families. More than half of children who have witnessed IPV are estimated to have been maltreated, and nearly one-third of maltreated children have witnessed IPV (Hamby, Finkelhor, Turner, & Ormrod, 2010). Thus, children raised in these circumstances may experience a family climate in which violence is chronic and pervasive among family members.

Both partner and child-directed violence are known risk factors for childhood psychopathology (Evans, Davies, & DiLillo, 2008; Ferguson, 2013; Gershoff, Lansford, Sexton, Davis-Kean, & Sameroff, 2012; Taylor, Manganello, Lee, & Rice, 2010), particularly when violence is qualitatively more severe, such that it involves greater danger or threat to the child's physical or emotional well-being (Jackson et al., 2014; Litrownik et al., 2005; Manly et al., 2001). However, efforts to determine the specific effects of violence between partners and towards children are often attenuated when they are examined together in the same statistical model (Bayer et al., 2011; Holmes, 2013). While this may be attributed to multicollinearity, it is also possible that neither form of violence uniquely "drives" the effects on children. Indeed, some studies of young children have indicated additive risk associated with "poly-victimization," meaning exposure to multiple forms of trauma, such as witnessing IPV in combination with child abuse or other forms of trauma (Graham-Bermann et al., 2012; Grasso, Petittlerc et al., 2016). Characterizing the shared climate of family violence engendered by the totality of violence among family members may help reconcile these conflicting patterns.

The bifactor modeling approach offers a means of unpacking these dimensions. This method assumes that all items being tested assess the same overall construct (shared family violence) and that subsets of items reflect specific subdomains of this construct (IPV, harsh parenting) that would otherwise be correlated if not for the shared family violence trait (Holzinger & Swineford, 1937; Jennrich & Bentler, 2011; Reise, Morizot, & Hays, 2007; Willoughby, Blanton, & Family Life Project, 2013). The bifactor method is a response to specific failings of the hierarchical factor model and allows what would otherwise be a complex hierarchical structure to be stated simply. The hierarchical factor model would require factor models of both IPV and harsh parenting, as well as a second-order factor that explains the general contributions of both subdomains. This method assumes equal weighting of IPV and harsh parenting (which may or may not be appropriate) and creates factors that are likely to be highly correlated. In contrast, the bifactor model allows a shared family violence factor to directly predict behaviors, while simultaneously creating residualized specific factors that represent unique variance in IPV and harsh parenting that is specific to each of those constructs. These factors are uncorrelated by definition: the assumptions of the bifactor model create specific IPV and harsh parenting factors that partial out or control for shared family violence. Additionally, all items load on the shared factor directly, so the relative importance of each behavior is free to vary and respond to the data rather than be forced to equality by modeling assumptions. This makes the bifactor model a better theoretical fit to our hypotheses and a better methodological tool given the inherent associations between the IPV and harsh parenting subdomains that make up the shared family violence construct.

In applying the bifactor model to family violence, this study builds on psychiatric research. These models have proven useful for characterizing psychiatric conditions that are highly comorbid or correlated (Gibbons et al., 2007). By specifying this shared variance, these models have enabled narrow band specification of clinical phenomena that have proven valuable for linkage to neural and genetic substrates (Krueger et al., 2002; Shanmugan et al., 2016). Similarly, partner and child-directed violence often co-occur. By modeling a "shared family violence" factor and content factors reflecting each type, the bifactor model is well suited theoretically and methodologically to our hypotheses and available data. In this study, we apply this model to survey items assessing the frequency/chronicity of physical and verbal violence that range in *qualitative severity* from milder behaviors, such as shouting and yelling, to more severe behaviors, such as slapping and hitting. As such, the factors identified will reflect these items' frequency and severity. We hypothesize that a shared family violence factor and orthogonal content factors for harsh parenting and partner violence will fit the data well.

1.1. The present study

The overarching aim of this study is to illustrate the value of a bifactor model for unpacking dimensions of family violence so as to isolate the shared climate of family violence and the ways it manifests between partners and towards children. The aims of this study are to: (1) investigate the fit of a bifactor model that specifies a shared family violence factor (onto which all items may load) and two orthogonal factors reflecting partner violence and harsh parenting in a large community-based sample, (2) test the fit of this model across key strata for age, sex, ethnicity, and poverty status, (3) illustrate the prevalence and frequency of violent behaviors along the identified factors so as to enhance understanding of the variation captured by them, (4) examine the construct validity of the resulting factors through their associations with child psychopathology and impairment, and (5) explore the factors' predictive validity in relation to independent, coder ratings of parenting, child abuse, and witnessed partner violence. These aims are examined in a large, multi-sample study of young children, ages 3–5 years, who were originally recruited from pediatric primary care practices in a large urban region. Data are examined from three samples. The first sample was designed for the testing of model fit, statistical calibration of item parameters, and testing of fit across key demographic strata. Its sampling frame was explicitly designed to yield the diversity required for the analyses planned. A second survey sample was designed for independent validation of the model identified in the first sample. Finally, a third sample (drawn from the second sample) was designed for multi-method validation against intensive laboratory assessments that include in-depth coded data on parenting, child abuse, and intimate partner violence (IPV).

2. Method

2.1. Sample and participants

2.1.1. Pediatric survey samples

The Multidimensional Assessment of Preschoolers Study (MAPS) is a two-phase study of diverse families recruited from pediatric clinics in a large urban region from 2009 to 2013 (Wakschlag et al., 2014; Wakschlag et al., 2015). In the first phase, a “Calibration” sample was enrolled for the purpose of modeling family violence and generating calibrated parameter estimates to be utilized in the second phase. This calibration technique is commonly used in scale construction where the characteristics of a scale are validated in a large representative sample so that scoring of a measure remains invariant across diverse applications and populations. Validating scales on calibration samples is an important step used in the development of PROMIS and NIH Toolbox measures (Cella et al., 2007, 2010). The calibration sample was stratified to achieve roughly comparable numbers across age, sex, poverty and ethnicity strata (see Table 1). Recruitment of a given stratum was closed as target numbers were reached. This stratification was designed to ensure that the sample was relatively evenly distributed by child age and sex and to reduce the often high overlap between poverty status and minority ethnicity. In the second phase, a “Validation” sample was recruited from the same pediatric practices as the Calibration sample (see Table 1). Unlike the Calibration sample, the Validation sample was not formally stratified, although the recruitment sources ensured ethnic and socioeconomic heterogeneity.

Parents were screened by research assistants in the pediatric clinic waiting rooms to determine eligibility using the following criteria: legal guardian of a 3- to 5-year-old child, able to participate in English or Spanish, had not previously participated in that phase of the study. Calibration phase children were not eligible for the second sample. Supplemental Fig. 1 summarizes the recruitment process and participation rates. In the Calibration phase, 1,517 of 1,814 eligible parents participated (83.6% response

Table 1
Participant characteristics at the time of the pediatric survey (%).

		Calibration Sample		Validation Sample		
		Full sample N = 1,490	Partner sample N = 1,179	Full sample N = 1,857	Partner sample N = 1,316	Intensive subsample w/partners N = 365
Child sex	Boys	51.1	51.4	48.7	50.1	50.1
	Girls	48.9	48.6	51.4	49.9	49.9
Child age	36-47 months	35.2	35.1	40.0	40.0	37.2
	48-59 months	35.8	35.6	37.1	37.9	41.0
	60-72 months	29.0	29.3	22.4	22.1	21.8
Ethnicity/race	Non-Hispanic White	27.6	32.1	23.9	29.6	31.5
	Black/African American	36.3	29.9	42.4	33.8	40.3
	Hispanic/Latinx	36.1	38.0	32.0	34.5	26.9
	Other	0.0	0.0	1.7	2.1	1.4
Relationship to child	Mother	91.4	90.5	92.4	92.0	100.0
	Father	7.0	8.0	5.2	6.2	0.0
Respondent education	< HS	8.6	8.5	5.5	5.6	3.1
	High school degree/GED	28.3	27.5	25.6	24.0	18.4
	Some education > HS	63.1	64.0	68.9	70.4	79.5
Poverty status	Non-poor	58.0	62.9	55.2	63.0	60.6
	Poor	42.0	37.1	44.8	37.0	39.4
Relationship status	Married or cohabitating	65.1	80.6	60.6	82.7	83.8

rate). In the Validation phase, 1,903 of 2,331 eligible parents participated (81.6% response rate). Children reported to have autism spectrum disorders or serious developmental delays and six children with key missing data were excluded from analyses. Sociodemographic characteristics of participants are provided in Table 1. Both samples were ethnically and socioeconomically heterogeneous. Compared with the stratified Calibration sample, the Validation sample included a greater proportion of families of minority ethnicity [$\chi^2(3,3323) = 53.14, p < .0001$] and somewhat younger children [$\chi^2(2,3332) = 19.75, p < .0001$]. Child sex and poverty status were similar in the two samples ($p > .10$).

2.1.2. Intensive validation subsample

Lab visits were conducted in a subsample of the Validation sample. Families were sampled based on report of any past year intimate partner violence or disruptive behavior in the top 15% of the sample. Eligibility was restricted to biological mothers who were able to participate in English. Please see Table 1 for sociodemographic characteristics. Further details about this cohort are available in prior publications (Nichols et al., 2015).

2.2. Procedures

For the survey study, research assistants approached all adults with young children in pediatric clinic waiting rooms to determine eligibility. Eligible parents completed a survey in the clinic waiting room (91%) or at home (9%). Ninety-two percent participated in English. Eight percent completed a Spanish version of the survey that was generated with certified translation and back-translation procedures. A subsample of families participated in lab visits that included mother-child interactions and semi-structured interviews about parenting and family conflict, among other measures. Informed consent was obtained for all study procedures except for the initial screening in the clinic (for which a consent waiver was obtained). All procedures were approved by institutional review boards at two universities. Mandated reporting guidelines were followed. Participants were compensated for their time.

3. Measures

3.1. Family violence

Intimate partner violence intimate partner violence in the past year was measured with four items that ranged in severity from verbal aggression (e.g., *Threatened...*) to direct physical violence (e.g., *Pushed, grabbed, or shoved*). Parents rated the frequency of these behaviors on a 6-point scale: 0 = never, 1 = seldom, 2 = occasionally, 3 = frequently, 4 = very often, 5 = always. Parents who reported being in a relationship completed this questionnaire. Individual items were used in analyses.

Harsh parenting was measured with the 5-item Parenting Practices Questionnaire (Gorman-Smith, Henry, Tolan, & Schoeny, 2010). Items ranged in severity from milder forms (e.g., *Yell or scream at your child*) to more severe physical violence (e.g., *Slap or hit your child*). Parents rated how often in a typical week within the past month they behaved in the way described when their child misbehaved. Items were rated on a 6-point scale: 0 = never, 1 = seldom, 2 = occasionally, 3 = frequently, 4 = very often, 5 = always. Individual items were used in analyses.

3.2. Child psychopathology

Parent-report measures explicitly designed for developmental sensitivity in the preschool period were used. Mood and anxiety problems were assessed with the General Anxiety, Separation Anxiety, and Depression/Withdrawal scales of a preschool version of the Infant-Toddler Social and Emotional Assessment (P-ITSEA) (Carter & Briggs-Gowan, 2006). This version of the ITSEA had been adapted by its authors to reflect the additional developmental demands placed on preschoolers ($\alpha = .69-.79$). Attention and Activity/Impulsivity were also assessed with the P-ITSEA ($\alpha = .73$ and $.79$, respectively). Disruptive behavior problems were assessed with the Aggression, Noncompliance, Temper Loss, and Low Concern for Others scales of the Multidimensional Assessment of Preschool Disruptive Behavior (MAP-DB), a developmentally-sensitive measure of preschool disruptive behavior [Cronbach's alpha (α) = .92-.97] (Wakschlag et al., 2014).

3.3. Impairment

Impairment was assessed with the Family Life Impairment Scale (FLIS) (Carter et al., 2010). The FLIS includes 36 items rated on a 3-point scale (0 = Not true, 1 = Somewhat true, 2 = Very true). Parents rated the extent to which their child's problem behaviors interfered with functioning in three child/family domains ($\alpha = .75$ to $.81$). The child impairment scale assesses limitations in participating in developmentally appropriate activities, such as playing with other children, doing independent activities, and participating in group activities. Childcare/preschool impairment assesses difficulties such as requiring extra attention from the teacher, school complaints about the child, and being asked to leave a care setting. Family impairment assesses limitations in family activities, such as visiting family and friends, using public transportation, and meeting new people or going to new places. Finally, the parental impairment scale assesses the extent to which the parent views the child's difficulties as creating problems, such as disagreements with their partner, feeling exhausted all day, and/or being unable to visit family and friends as much as they would like ($\alpha = .59$).

Mothers completed a lay version of the Children's Global Assessment Scale (CGAS) (Shaffer et al., 1983), rating children's overall functioning at school, home, and with peers from 0 to 100. Sample anchors: 1–10 = Extremely impaired, requires constant

supervision; 41–50 = Obvious problems, severe problems causing trouble in most situations; and 81–90 = Doing well in all areas, occasional minor upsets or everyday worries but general functioning is good.

3.4. Observed parenting

Within the lab visit sample, maternal behaviors were observationally coded based on 30 min of standardized mother-child interactions. The paradigm included a series of “do” and “don’t” tasks designed to “press” for child problem behaviors and negative affect, such as waiting, a difficult puzzle, and clean-up tasks (Wakschlag et al., 2011). Mothers received simple instructions and materials for each activity. Maternal behaviors in this interaction were globally coded based on video review with the Parent-Clinical Observation Schedule (P-COS) (Hill, Maskowitz, Danis, & Wakschlag, 2009). The P-COS coding characterizes parenting on a continuum from competent to clinically concerning. Coding yields three domain scores: Problematic Discipline (e.g., harshness, emotional misattunement); Responsive Involvement (e.g., parental engagement, scaffolding); and Constructive Discipline (e.g., reinforcement). Correlations among these domains ranged from $-.46$ to $.31$. Inter-rater agreement was assessed on 20% of all interactions, selected at random (*Agreement* = 72%–100%). Excellent test-retest reliability has been reported (*intraclass correlation coefficient* = $.82$) (Hill et al., 2009).

3.5. Probable child abuse

Within the lab visit sample, others were interviewed about child-rearing behaviors with the semi-structured *Family Socialization Interview-Revised (FSI-R)* (Briggs-Gowan et al., 2011). The FSI-R addressed mothers’ and their partners’ disciplinary practices with the child with probes designed to capture the severity of methods used (e.g., use of hand on skin, use of an object). Independent coders who were unaware of children’s status watched videos of the interview. They then rated the usual and most intense physical discipline used by the mother and her partner as follows: 0 = none; 1 = mild, minor physical contact likely to cause minimal or no distress; 2 = moderate, physical contact likely to cause discomfort but not leave a mark, e.g., spanking; 3 = moderately severe, significant physical contact that causes discomfort and may leave a mark, e.g., prolonged spanking, use of object on clothing; 4 = severe, physical discipline that leaves more permanent mark, e.g., object on bare skin. Probable abuse was positive if mother or her partner was rated as using moderately severe or severe discipline with the child in the past year. Twenty-percent of interviews were randomly selected for coding by pairs of independent raters. Mean inter-rater reliability among pairs of raters was *Kappa* = $.84$. These scores also correlate positively with the physical aggression scales of the Conflict Tactics Scale, supporting their validity ($r = .36$ – $.42$) (O’Dor et al., 2016).

3.6. Witnessing partner violence

The FSI-R also assessed partner violence when the child was in the home. Interviewers inquired about conflict and probed for descriptions of the most intense incidents during the past year. Independent coders who were blind to parents’ status used ordinal codes to rate the severity of verbal and physical violence. Analyses utilized a dichotomous variable based on these codes that reflected the presence in the past year of moderate to severe physical and/or verbal IPV. IPV was present (i.e., coded 1) if one or more incidents included *physically violent behaviors* (e.g., pushing, destroying property, hitting, punching, threatening with a weapon, or physical harm) and/or *verbally violent behaviors* (e.g., screaming, yelling, or shouting that was “out of control” or involved physical threats). A code of 0 meant that no conflict was reported or any conflict that was reported involved mild verbal conflict such as brief yelling that was not out of control or threatening, or milder physical behaviors such as slamming doors or stamping feet. Inter-rater agreement on this dichotomous variable was *mn Kappa* = $.71$.

3.7. Sociodemographic variables

Parents reported on child age, sex, ethnicity, household size, and income. Poverty status was established using Federal poverty thresholds (U.S. Census Bureau, 2013) based on income and number of adults and children in the home.

3.8. Analytic approach

The first set of analyses examined the prevalence of individual violent behaviors, tested the fit of the bifactor model, and generated parameter estimates in the Calibration sample for subsequent use in validating analyses in the second, Validation sample. The stratified sampling design of the Calibration sample made it particularly well suited for these analyses, as it was balanced with regards to sex, race, poverty, and child age. A confirmatory bifactor model was tested in which we specified (1) a shared family violence factor on which all items loaded, (2) an IPV factor on which the four IPV items loaded, and (3) a harsh parenting factor on which the five harsh parenting items loaded. This model was fit to data for families who provided partner data. Estimation was carried out using robust maximum likelihood estimation (MLR) with ordered categorical indicators in Mplus version 6.11 (Muthén & Muthén, 2010). The top three response categories for all nine items (Frequently, Very often, Always) were rarely endorsed and therefore were collapsed to allow four categories for each item (0 = never, 1 = seldom, 2 = occasionally, 3 = frequently, very often, or always). One loading for each factor was fixed to one for identification, factor variances were estimated (default parameterization), and item parameters were estimated using logit link function in conjunction with Mplus MLR estimation. Covariances among factors

were fixed to zero, as required by the bifactor model. Fit was examined in the full sample, and across age, sex, ethnicity and poverty strata. To gain descriptive insight into the “meaning” of the factor scores generated, each factor was divided into quartiles, and the frequencies of the nine individual items were examined across the quartiles.

The second phase of the study examined the validity of the bifactor model in the second sample, using factor score parameterization generated in the Calibration sample. Two sources of validity data were used in these analyses: parent reports of symptoms obtained in the pediatric survey sample ($N = 1,316$) and in-depth data on impairment, observed parenting, and coded interview data on probable child abuse and witnessed IPV obtained in a subsample of families ($N = 365$). Descriptive statistics for the validating variables are provided in supplemental materials. A series of four multivariate regression models were used to examine validity. These regression models included the factors from the bifactor model with parameters fixed to the estimates from the Calibration sample, and the validating measures regressed on the factors from the bifactor model. Each of these multivariate regressions examined a related set of validators: mood/anxiety (general anxiety, separation anxiety, depression/withdrawal subscales), disruptive/externalizing behavior (aggression, non-compliance, temper loss, low concern for others, activity/impulsivity), impairment (CGAS, four FLIS subscales), and observed parenting (three domains from the P-COS). Finally, the predictive validity of the family violence factors was evaluated with dichotomous variables reflecting probable abuse and witnessed IPV obtained from the coded FSI-R interview. All analyses that used data from the lab visit controlled for the time interval between the pediatric survey and the visit ($mean = 6.8$ months, $standard\ deviation = 4.19$, $range = 1.5$ to 28.3). These regressions were run both in Mplus, to take full advantage of our latent family violence severity factor, and in SAS, to use more conventional regression methods; these regression methods required that factor scores be estimated and treated as observed variables. Both methods showed comparable results and no differences in which parameters are statistically significant, but slight parameter differences exist due to the differences between latent variable modeling and estimated factor scores. Because of the number of tests conducted, a conservative alpha level of .01 was set as a threshold for interpretable effects.

4. Results

4.1. Prevalence of family violence

The prevalence of verbal aggression towards children in a “typical week” in the past month ranged from the very common behavior of *yelling/screaming at the child* (87.4%) to less common behaviors, including using *bad language/cursing at the child* (23.3%) and *threatening to hurt the child* (9.4%). *Spanking* was prevalent (58.3%). Fewer parents reported *slapping or hitting but not spanking the child* (< 11%) (see Supplemental Table 1). Approximately 21% of parents endorsed “any” IPV in the past year, with individual IPV behaviors ranging in prevalence from 8% to 12% (see Supplemental Table 2). “Any” physically harsh parenting and “any” IPV were significantly related ($\phi = .18$, $p < .01$); 37% reported neither form, 49% reported only one form, and 16% reported that both forms occurred “seldom” or more often.

Prevalence estimates of “any” physically harsh parenting and “any” IPV were similar across child age, sex, and poverty status groups (all $p > .01$, *data not shown*). However, there were ethnic differences in use of *bad language/cursing*, *threatening to hurt the child*, and *spanking*; these differences were generally attributable to greater occurrence in African American/Black families relative to Hispanic and/or Non-Hispanic White families (see Supplemental Table 1). No ethnic differences in IPV were observed (see Supplemental Table 2).

4.2. Bifactor model of family violence

A bifactor model with 3 orthogonal factors provided excellent fit to the data in the Calibration sample ($\chi^2 = 469.73$, $df = 306$, $CFI = .99$, $RMSEA = .02$) (Bentler, 1990; MacCallum, Browne, Sugawara, 1996; Steiger, 1990). As hypothesized, all partner and child-directed items loaded positively and significantly on the shared family violence factor (please see Table 2). All child-directed items had strong positive loadings. This included physically severe items, such as *slapping or hitting the child (but not spanking)*, and verbal items, such as *threatening to hurt the child* and *yelling/screaming at the child*. The top loading IPV items similarly described both verbal and physical forms (*Threaten to hit or throw something*, *Pushed*, *grabbed*, *shoved*). All four IPV items loaded positively on the IPV factor. For harsh parenting, the two physical items (*spanking* and *slapping/hitting but not spanking*) had significant positive loadings. In contrast, *bad language/cursing* had a marginal negative loading and neither *yelling/screaming* nor *threatening the child* loaded on the parenting factor. Thus, high scores on this factor appear to reflect physically harsh parenting without bad language/cursing or other verbal aggression. In light of the orthogonal factor structure, the pattern of relatively weak loadings on the harsh parenting factor and strong loadings on the shared factor indicate that much of the observed variation in harsh parenting items was accounted for in the shared factor.

The bifactor model fit the data similarly across child age, sex, and poverty groups (all difference tests from multi-group models, ns) (see Supplemental Table 3). There was slight variation in the magnitude of factor loadings by ethnicity, *difference* $\chi^2(36, N = 1,163) = 62.50$, $p < .01$, but the model fit the data equally well across ethnic groups, *single-group model*, $\chi^2(18, N = 1179) = 25.33$, (see Supplemental Table 3).

The bifactor model provided similarly excellent fit to the data from the Validation sample ($RMSEA = .02$). Fit was similarly excellent with parameters constrained to values estimated in the Calibration sample, with no decrement in fit relative to a freely estimated bifactor model ($RMSEA = .03$) (see Supplemental Table 4). Thus, as planned, this Calibration sample scoring was used in the validating regressions below.

Table 2

Structure of family violence identified via bifactor model (Calibration sample, N = 1,179).

	Item Frequency (%)				Bifactor model loadings					
	Never	Seldom	Occas	Freq+	Harsh Parenting		IPV		Shared Violence Factor	
					Est	(SE)	Est	(SE)	Est	(SE)
Harsh Parenting (Typical Week)										
Use bad language or curse?	77.0	17.4	3.5	2.1	-.36	(.12)*			.91	(.06)***
Yell or scream at your child?	22.0	40.6	25.4	12.0	.22	(.12)			.62	(.04)***
Threaten to hurt your child?	91.7	5.3	2.0	1.0	.16	(.12)			.76	(.04)***
Give your child a spanking?	43.8	37.4	13.9	5.0	.25	(.10)*			.57	(.05)***
Slap or hit your child (but not spanking)?	90.0	8.1	1.0	0.8	.41	(.10)***			.61	(.07)***
Intimate Partner Violence (Past year)										
Threatened to hit or throw something?	91.7	5.7	1.8	0.8			.73	(.04)***	.49	(.05)***
Threw, smashed, hit, kicked something?	88.0	8.7	2.2	1.1			.75	(.04)***	.36	(.05)***
Threw something at each other?	92.0	5.3	1.6	1.0			.76	(.04)***	.37	(.05)***
Pushed, grabbed, or shoved each other?	89.4	8.1	1.9	0.6			.72	(.04)***	.45	(.05)***

Note. Occas = Occasionally, Freq = Frequently, Very Often or Always; Est = standardized parameter estimates, SE = standard error;

* $p < .01$, ** $p < .001$, *** $p < .0001$.

4.3. Frequency of violent behaviors according to quartiles on each factor

To aid interpretation, the frequencies of individual items were examined across quartile splits on each factor. Families scoring in the top quartile on the shared family violence factor (“high”) differed significantly from all other quartiles on all verbal and physical harsh parenting behaviors except for *spanking*, which was similar to the moderate quartile (please see Fig. 1). Violent behaviors were both more common and more frequent in the highest quartile: more than 80% of parents reported *spanking*, *yelling/screaming*, and using *bad language/cursing* and many did so frequently in a typical week. *Bad language/cursing* occurred almost exclusively in the highest quartile. Partner violence behaviors showed linear increases across the low/mild, moderate, and high groups. Examination across quartiles on the IPV factor revealed that IPV behaviors occurred exclusively in the highest IPV quartile (data not shown). In this quartile, 33% endorsed *Throw something*, 38% *Threaten physical*, 52% *Push/Grab/Shove*, and 61% *Thrown/smashed/kicked something*. Most IPV behaviors were reported to occur infrequently (“seldom”). For the harsh parenting factor, *spanking* (80%) and *slapping/hitting* (33%) were significantly more common in the highest quartile than in lower quartiles ($p < .01$). However, verbally harsh parenting behaviors were comparable across groups (data not shown). This further supports our interpretation of this factor as capturing physically harsh parenting.

4.4. Family violence factors and child symptoms

Multivariate regression analyses accounting for shared family violence and the two specific factors from the bifactor model revealed differentiated patterns of association with symptoms in the Validation sample (please see Table 3). Higher scores on the shared family violence factor were associated with elevations across emotional and behavioral domains. Effect sizes (β) were generally moderate ($\beta = .16$ – $.35$). Furthermore, with shared family violence controlled, the IPV factor was only related to General Anxiety ($\beta = .16$). The physically harsh parenting factor was uniquely associated with Activity/Impulsivity, Inattention, Aggression and Low Concern for Others ($\beta = .13$ – $.20$). However, physically harsh parenting was not significantly related to the remaining externalizing scales or any internalizing scale. Model fit was comparable across ethnic strata (difference tests $p > .05$), supporting the generalizability of these patterns regardless of families’ socioeconomic or ethnic background.

4.5. Family violence factors and child and family impairment

The multivariate impairment model revealed that the shared family violence factor significantly predicted all indicators of impairment, including child specific impairment, difficulty in the child care setting, interference with family routines and activities, and parental impairment (Table 4). Most effect sizes were in the moderate range. Physically harsh parenting more specifically predicted indicators of child functioning, including poorer functioning on the CGAS and more impairment in developmentally-appropriate activities on the FLIS Child Impairment scale. The IPV factor was not associated with impairment.

4.6. Family violence factors and observed parenting

Examination of observational parenting data revealed that the shared family violence factor was positively related to problematic discipline ($\beta = .22$). It was not significantly associated with constructive discipline or responsive involvement, although patterns were in the expected direction (Table 4). Neither the physically harsh parenting factor nor the IPV factor was significantly associated with observed parenting.

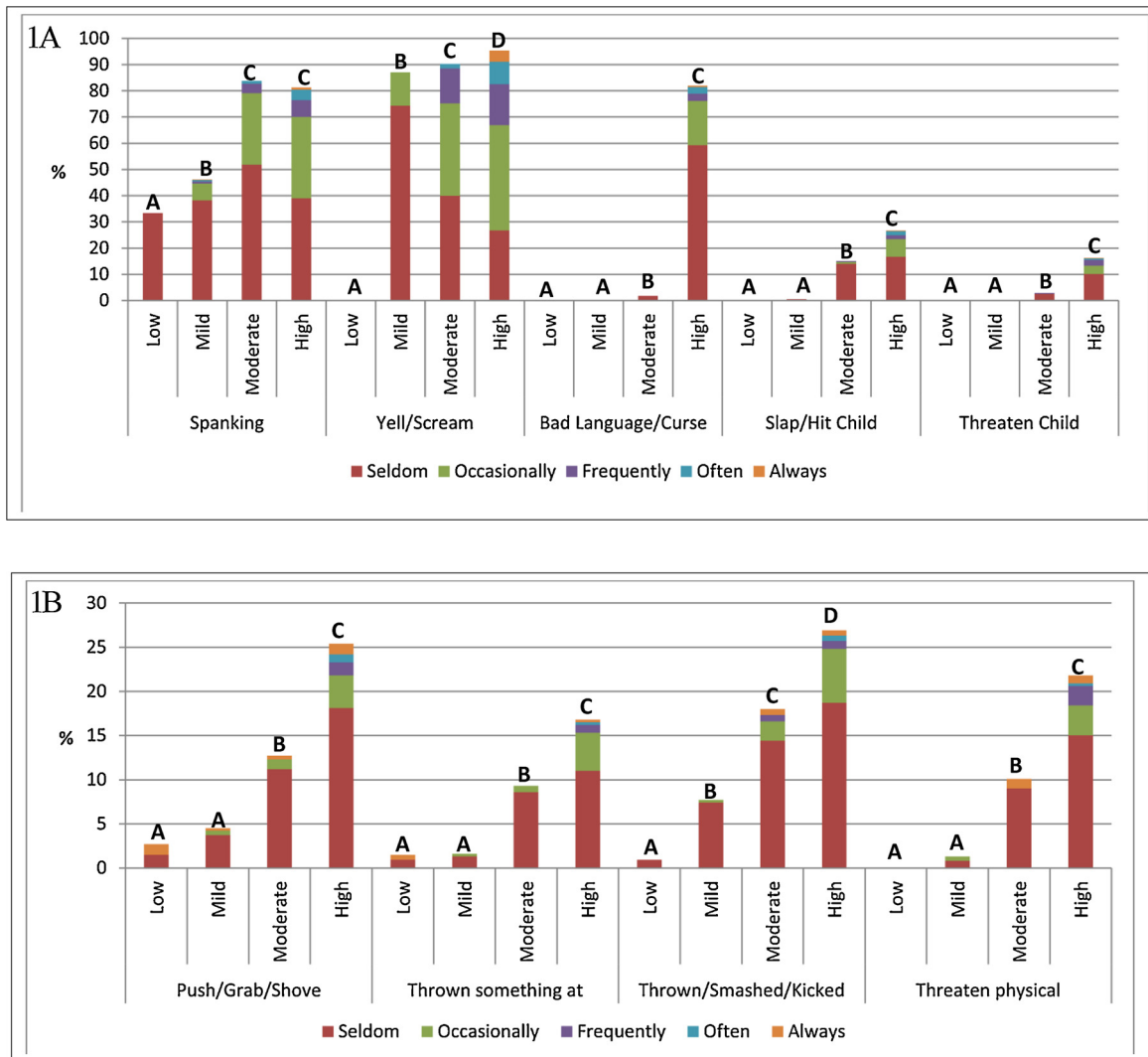


Fig. 1. 1A. Frequency of Harsh Parenting Behaviors by Quartiles on the Shared Family Violence Factor, 1B. Frequency of IPV Behaviors by Quartiles on the Shared Family Violence Factor. Groups labelled with different letters are significantly different from one another.

4.7. Family violence factors and prediction of maltreatment

According to coded data from the in-depth FSI-R interview, 20.1% ($n = 59$) of children had experienced probable child abuse and 9.6% ($n = 28$) had witnessed IPV in the past year. These indicators of violence exposure were not significantly related, $\chi^2(1,291) = 1.45, ns$ (8 children had experienced both). The shared family violence factor predicted probable abuse ($\beta = .43$). The IPV factor predicted witnessing IPV ($\beta = .46$) (see Table 4). Both of these associations were medium size effects. No other significant associations were observed.

5. Discussion

Several important findings emerged from this study: (1) prevalence estimates are similar to those previously reported for young children, (2) family violence is similar across diverse populations, and (3) shared “violent family climate” should be considered in family-wide approaches involving young children. More generally, findings underscore the importance of achieving a firmer grasp on how violence manifests within families with young children. Methodologically, a bifactor method may prove valuable for quantifying the overall family climate of violence towards estimating risk. Indeed, more severe shared family violence was moderately strongly associated with many indicators of children’s symptoms and impairment, as well as mothers’ impairment, whereas partner violence and physically harsh parenting showed more specific associations. Moreover, although derived from mothers’ reports, shared family violence predicted less optimal parenting in videotaped mother-child interactions and independent ratings of probable child abuse obtained from in-depth interviews. Thus, this method may be a step toward enhanced characterization of a facet of family violence

Table 3

Relationships between family violence constructs and children's symptoms (Multivariate regression models in Validation sample, N = 1,316).

	Harsh Parenting			IPV			Shared Violence Factor		
	<i>Est</i>	<i>(SE)</i>	β	<i>Est</i>	<i>(SE)</i>	β	<i>Est</i>	<i>(SE)</i>	β
Internalizing Model									
Separation Distress	0.06	(0.04)	.08	0.01	(0.01)	.05	0.06	(0.01)	.17***
General Anxiety	0.06	(0.03)	.12	0.02	(0.01)	.16**	0.00	(0.01)	.02
Depression/Withdrawal	0.05	(0.02)	.13	0.01	(0.00)	.09	0.03	(0.01)	.16***
Externalizing Model									
Activity/Impulsivity	0.10	(0.03)	.13*	0.00	(0.01)	.02	0.10	(0.01)	.32***
Inattention ¹	0.12	(0.03)	.20***	0.01	(0.01)	.06	0.06	(0.01)	.24***
Temper Loss	3.04	(1.54)	.10	0.56	(0.29)	.08	3.78	(0.40)	.29***
Non-Compliance	3.41	(1.56)	.11	0.19	(0.31)	.03	4.53	(0.41)	.35***
Aggression	4.28	(1.35)	.18**	0.45	(0.25)	.08	3.40	(0.33)	.33***
Low Concern - Disregard	1.39	(0.51)	.15 [†]	0.09	(0.08)	.04	1.11	(0.14)	.28***

Note. ¹Inattention = lower scores on the P-ITSEA Attention Skills subscale.

Regression β are interpreted as effect sizes with $\beta > .50$ considered large; β between .30 and .49 medium; β between .15 and .29 small to moderate; and β in the range of .1 considered small (Pearson r is approximately equal to β) (Nieminen, Lehtiniemi, Vähäkangas, Huusko, Rautio, 2013).

* $p < .01$, ** $p < .001$, *** $p < .0001$.

Table 4

Relationships between family violence constructs and impairment, observed parenting, and coded maltreatment (Multivariate regression models conducted in the Intensive Subsample).

	Harsh Parenting			IPV			Shared Violence Factor		
	<i>Est</i>	<i>(SE)</i>	β	<i>Est</i>	<i>(SE)</i>	β	<i>Est</i>	<i>(SE)</i>	β
Impairment Model (n = 365)									
C-GAS Score ¹	-5.69	(2.93)	-.25**	1.11	(0.82)	.21	-4.71	(2.00)	-.49***
FLIS Child care setting	0.10	(0.43)	.02	0.10	(0.08)	.11	0.30	(0.09)	.18*
FLIS Child impairment	0.64	(0.26)	.29**	-0.07	(0.07)	-.14	0.34	(0.16)	.36*
FLIS Family impairment	0.71	(0.38)	.23	-0.09	(0.10)	-.13	0.47	(0.25)	.36*
FLIS Parental impairment	-0.26	(0.26)	-.10	0.01	(0.05)	.01	0.31	(0.09)	.26***
Observed Parenting Model (n = 296)									
Problematic discipline	0.04	(0.14)	.03	0.02	(0.02)	.06	0.13	(0.03)	.22***
Constructive discipline	-0.26	(0.26)	-.12	0.02	(0.07)	.05	-0.28	(0.13)	-.31#
Responsive involvement	-0.89	(0.70)	-.14	0.13	(0.16)	.09	-0.68	(0.29)	-.25#
Maltreatment Model (n = 293)									
FSI Probable Abuse	0.50	(0.56)	.14	-0.03	(0.11)	-.03	0.66	(0.22)	.43***
FSI Witnessed IPV	-0.91	(-0.93)	-.24	0.40	(0.16)	.46**	0.29	(0.17)	.18

Note. ¹Positive scores on the CGAS reflect better functioning.

$p < .05$, * $p < .01$, ** $p < .001$, *** $p < .0001$.

that may be important for predicting adverse outcomes for young children.

To our knowledge, this is one of the first studies to estimate the prevalence of harsh parenting and IPV in families with preschool-age children recruited from pediatric primary care settings. The prevalence of these behaviors, including spanking, were remarkably consistent with prior estimates for this developmental period. Evidence that spanking was somewhat more common in African American/Black families further aligns with reports of ethnic differences in spanking by Gershoff et al. (2012).

Despite the ethnic variation in prevalence, the structure of family violence was similar regardless of sociocultural background. The bifactor model revealed a multi-dimensional structure of family violence that included a shared family violence factor and individual factors for partner violence and physically harsh parenting. These dimensions incorporated behaviors that varied in qualitative severity from milder to more severe within the family. In contrast with approaches that treat parent-child violence and partner violence as separate but related factors, the bifactor structure consists of orthogonal factors in which each item loads both on the shared violence factor and on one (and only one) content factor. This structure often provides a closer fit to the data than other first- and second-order models, and for that reason is becoming an important method for resolving questions of dimensional structure (Reise et al., 2007). Unlike other structures, the bifactor structure provides for equifinality, that is, equally high levels of family violence resulting from exposure to intimate partner violence, harsh parenting, or a combination of the two.

This bifactor model supported three facets of family violence. *Shared family violence* reflected mild to severe violent behaviors that occurred at varying levels of frequency/chronicity among family members. Indeed, items that loaded on this factor included qualitatively severe behaviors that occurred at generally lower frequency/chronicity (e.g., *push/grab/shove partner*), moderately severe behaviors with high frequency/chronicity (e.g., *spanking*), and mild behaviors with high frequency/chronicity (e.g., *yelling/screaming*). In families whose scores fell in the top quartile on the shared violence factor, *yelling/screaming* or using *bad language*/

cursing at the child were chronic: 80%–90% reported that these behaviors occurred at least weekly, often more frequently. Thus, although verbal aggression is typically considered a qualitatively milder form of violence (Jackson et al., 2014; Litrownik et al., 2005; Manly et al., 2001), when chronic it appears to contribute to a more severe climate of family violence, particularly when accompanied by physical violence among family members. The *IPV factor* reflected physical aggression and threatening behaviors between partners. Finally, the *physically harsh parenting factor* reflected the degree of physical (but not verbal) aggression toward the child.

This multidimensional model of family violence offered insight into a differentiated pattern of associations with child symptoms that might have been obscured by more traditional methods. Shared family violence was associated with separation distress, depression, all measures of disruptive behavior problems, and attention-deficit/hyperactivity problems, with generally moderate effect sizes. The broad, cross-domain nature of these disruptions suggests that chronic exposure to verbal and physical aggression, whether directed at the child or occurring more generally within the family, may undermine the development of early regulatory capacities involved in stress-responses, compromising young children's regulation of emotional and behavioral responses and giving rise to a broad array of difficulties. A future extension of this work will be to establish the statistical threshold on this construct at which disruptions in developing regulatory skills and stress responses can first be identified.

Meta-analyses have indicated that harsh parenting and intimate partner violence are broadly associated with difficulties across the internalizing and externalizing domains (Evans et al., 2008; Ferguson, 2013; Gershoff, 2002; Kitzmann, Gaylord, Holt, & Kenny, 2003; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003). However, our findings suggest that such cross-cutting effects may be better attributed to the overall climate of family violence, rather than harsh parenting or intimate partner violence specifically. Indeed, neither form was associated with problems in *both* domains, and in each case the pattern observed hinted at different etiologies. Whether similar patterns are observed in later developmental periods is an important empirical question, as young children may be especially vulnerable to stress in the family environment.

More specifically, once shared family violence was accounted for, IPV was associated with general anxiety. Ongoing exposure to violence, threats, and anger between parents may elicit a specific problematic pattern of hypervigilance and worry in young children. These findings highlight the relevance of a family-wide approach addressing anxiety in young children. Likewise, physically harsh parenting was specifically associated with problems related to attention-deficit/hyperactivity problems, aggression, and low concern for others. These linkages could mean that children's disruptive behaviors elicit harsh parenting or that harsh parenting begets aggressive behavior through heritability and social learning mechanisms (Patterson, Reid, & Dishion, 1992; Taylor & Kim-Cohen, 2007). Finally, the fact that physically harsh parenting was associated with two of the most severe forms of disruptive behavior may suggest the onset of an early starter disruptive/antisocial pathway (Lansford et al., 2002).

Children experiencing a more severe climate of family violence tended to be more impaired. In addition to predicting poorer global child functioning, the shared violence factor predicted greater difficulty in child care/preschool settings. This includes difficulty finding appropriate care, complaints about the child's behavior, and threats of expulsion. The shared factor was also related to limitations in children's participation in age-appropriate activities, such as playing with peers and participating in group activities. If borne out longitudinally, these patterns would suggest that growing up in a family climate of chronic verbal and physical violence may limit children's participation in key learning environments and social contexts that are centrally important to their social-emotional and cognitive development.

The shared violence factor was also associated with mothers' perceptions that the child's problem behaviors interfered with family life. For example, it was related to restrictions in family activities, such as socializing, taking the child on errands, using public transportation, and visiting family-friendly restaurants. It was also linked with mothers' perceptions that the child's problem behaviors interfered with their own functioning, including their partner relationships and ability to socialize. These findings suggest a narrowing of mothers' and children's social worlds that may further compound the isolation often associated with family violence.

Finally, independent coded data from our intensive subsample supported the validity of these constructs. The shared violence construct significantly predicted more problematic discipline in videotaped mother-child interactions. It also predicted probable child abuse established through independent ratings of in-depth interviews with mothers about their own and their partners' usual and most intense disciplinary methods in the past year. Thus, children living in homes with more severe violence overall were significantly more likely to be victimized. Finally, supporting this model's capacity to parse violence patterns in meaningful ways, the IPV factor (but not the shared factor) predicted children's witnessing of IPV.

5.1. Limitations

Several limitations are worth discussion. First, this study relied on cross-sectional maternal report data for both violence exposure and symptoms. This prevents us from making causal interpretations about the effects of violence exposure on children's symptoms. The use of maternal reports may have led to underestimates of the prevalence of violence, due to potential stigma related to family violence or concerns about risk of reporting to child protective services. It also means that shared method variance may have contributed to the significant associations observed between violence exposure and children's symptoms and impairment. Finally, the survey about violence exposure was quite brief and did not assess features of violence that might differentially affect children. For example, different patterns might emerge if spanking were assessed in greater depth with items that described both milder and more severe forms of spanking (Lansford, Wager, Bates, Pettit, & Dodge, 2012). Similarly, the IPV items primarily described physical violence. Further longitudinal research with bifactor models derived from more extensive measures will be important in order to extend the patterns observed here and demonstrate effects on developmental pathways. It will also be crucial for future studies to replicate and test the validity of this bifactor method in other community cohorts and in other types of samples, including families with documented maltreatment or receiving domestic violence services.

6. Conclusions

Addressing exposure to family violence as early as possible in development, through screening, enhanced prevention, and secondary intervention, is a critical public health issue (Asnes & Leventhal, 2013). Understanding which features of violence are most detrimental is essential for redirecting the developmental trajectories of violence-exposed children towards more normative patterns. Our data suggest that young children exposed to a family climate of chronic and pervasive verbal and physical violence are at risk for disruptions in self-regulation and impairment. Accounting for different types of violence and the shared climate of violence engendered by these behaviors may help to identify those children who are at greatest risk. Longitudinal research will be important for elucidating the thresholds at which different features of violence exert lasting, harmful effects on young children, and for building enhanced identification and intervention development. Finally, numerous biologic processes, including genetic vulnerability, physiologic stress responses. And neural processes, likely influence developmental pathways following violence exposure (Gillespie, Phifer, Bradley, & Ressler, 2009; McLaughlin, 2016; Pollak, 2005). Translational integration of environmental characterization and key biomarkers may greatly enhance the precision and power of predictive models.

Conflict of interest

The authors have no conflicts of interest to disclose

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi: <https://doi.org/10.1016/j.chiabu.2018.06.006>.

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