

Mothers' Posttraumatic Stress and Child Adjustment Problems in Families Seeking Services for Intimate Partner Violence

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Objective: This study examines whether fluctuation in mothers' posttraumatic stress symptoms (PTSSs) predicts fluctuation in child adjustment problems in families seeking services for intimate partner violence (IPV). **Method:** Participants were 300 mothers (mean age = 30.65 years) of children (mean age = 6.88 years; 49% female) who were seeking shelter or legal services because of IPV. Most mothers identified as Hispanic (57%), followed by Black/African American (26%). Mothers reported PTSSs on a 7-item screening measure and reported child externalizing and internalizing problems on the Child Behavior Checklist. Mother and child functioning were assessed shortly after the mothers' requested services and then every 4 months for a 5-year period. **Results:** Eighty-one percent of mothers reported clinical levels of PTSSs at the initial assessment. As hypothesized, fluctuation in mothers' PTSSs predicted fluctuation in child externalizing and internalizing problems during the ensuing 4-month period. These relations, however, occurred within subjects but not between subjects. The within-subject associations emerged after accounting for IPV and mothers' depressive symptoms and were stronger for older children than younger children. The strength of the associations decreased over time. **Conclusions:** Addressing women's trauma symptoms at the point of seeking services for IPV has possible implications for child mental health. Attempting to reduce mothers' PTSSs may have positive effects for women as well as their children.

What is the public health significance of this article?

This study shows that fluctuation in mothers' posttraumatic stress symptoms predicts fluctuation in child adjustment problems in families seeking services for intimate partner violence. The findings suggest that reductions in mothers' posttraumatic stress will also lead to reductions in child problems.

Keywords: intimate partner violence, posttraumatic stress, child adjustment problems

Intimate partner violence (IPV) is a common and potentially traumatic event affecting women around the world (Devries et al., 2013). U.S. national surveys consistently indicate that over 20% of women experience IPV in their lifetime (Black et al., 2011; Breiding et al., 2014; Straus, Gelles, & Steinmetz, 1980; Tjaden &

Thoennes, 1998). In addition, a sizable proportion experience a "negative impact" directly connected to the IPV victimization, such as the need for legal services (7–9%) or emergency shelter (2–4%) or both (Black et al., 2011; Breiding et al., 2014). Many women requesting legal or shelter assistance for IPV have children (National Network to End Domestic Violence, 2009), and a large proportion of these children have significant adjustment problems (Grych, Jouriles, Swank, McDonald, & Norwood, 2000). Meta-analytic reviews indicate that parental IPV heightens child risk for a wide variety of adjustment problems, including externalizing problems such as aggression and defiance, and internalizing problems such as anxiety/depression and social withdrawal (Kitzmann, Gaylord, Holt, & Kenny, 2003; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003). Moreover, these children's adjustment problems are often long-lasting; in fact, longitudinal research indicates that the association between parental IPV and child adjustment problems is stronger as the length of time between the

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measurement of IPV and child adjustment increases (Vu, Jouriles, McDonald, & Rosenfield, 2016).

Women who seek services because of abuse by an intimate partner are often traumatized by their experiences of violence. They often have had to endure repeated and diverse acts of IPV (physical, sexual, and psychological violence) and have had to live with the fear and anxiety of experiencing future violence (Graham-Bermann & Miller, 2013). Not surprisingly, women who seek services for IPV often report significant posttraumatic stress symptoms (PTSSs); in fact, PTSSs are among the most common mental health sequelae of IPV (Ehrensaft, Moffitt, & Caspi, 2006; Golding, 1999). In the broader literature on parental PTSSs and child functioning, considerable cross-sectional research links parents' PTSSs to child externalizing as well as internalizing problems (Lambert, Holzer, & Hasbun, 2014). There is also some suggestion in this literature that it is the trauma symptoms rather than the traumatic events themselves that account for child problems in families affected by traumatic events (Chemtob et al., 2010; Yehuda, Schmeidler, Giller, Siever, & Binder-Brynes, 1998). That is, parents who develop PTSSs as a consequence of their exposure to a traumatic event are more likely to have offspring that experience externalizing and internalizing problems compared with parents who do not develop PTSSs. This might be because of a variety of factors. For example, high levels of PTSSs can interfere with the ability to process events and manage emotions effectively, characteristics arguably essential for being an effective parent to children who may also be experiencing problems (Levendosky & Graham-Bermann, 2000, 2001). Empirical evidence is consistent with theory suggesting that mothers who experience PTSSs as a consequence of IPV have difficulty providing their children with the necessary support to cope with the IPV (Chemtob & Carlson, 2004; Lannert et al., 2014; Levendosky, Bogat, & Martinez-Torteya, 2013; Levendosky & Graham-Bermann, 2000, 2001; Lieberman, Van Horn, & Ozer, 2005; Symes, McFarlane, Fredland, Maddoux, & Zhou, 2016), which might increase the likelihood of child adjustment problems.

Unfortunately, there is a dearth of longitudinal research on the link between mothers' PTSSs and child functioning (Lambert et al., 2014); thus, it is not clear whether fluctuation in mothers' PTSSs predicts future changes in child adjustment problems. By definition, cross-sectional studies on the association involve data collected at a single time point and cannot distinguish the temporal sequencing between mothers' PTSSs and child adjustment problems. In addition, all of the previous studies that have evaluated this relation used between-groups designs. These designs assess for differences in child functioning among families with relatively high versus low levels of mothers' PTSSs. Such studies have contributed valuable information on the association between PTSSs and child functioning, but between-groups designs are not ideal for ruling out potentially confounding third variables, such as children's history of exposure to IPV and child maltreatment (Jouriles, McDonald, Slep, Heyman, & Garrido, 2008). A longitudinal study with assessments at multiple time points permits analyses of within-subject (or within-family, with *family* referring to the mother-child dyad) change, allowing one to rule out uncontrolled third variables because the family serves as its own control (Bolger & Laurenceau, 2013). To our knowledge, there are no published studies on this topic that follow families seeking help

for IPV over an extended period of time and that conduct within-subject analyses.

Understanding how changes in mothers' PTSSs might predict changes in child adjustment problems is important for both research and practice. For example, if mothers' PTSSs actually influence child development, as family systems and developmental theories suggest (Chemtob et al., 2010; Levendosky & Graham-Bermann, 2000; Scheeringa & Zeanah, 2001), fluctuation in mothers' PTSSs should predict fluctuation in child adjustment over time. A study design that includes multiple assessments of mothers' PTSSs and child problems and a within-subject analysis might be the closest researchers can come to evaluating a causal link between these two variables (Bolger & Laurenceau, 2013). Knowledge of whether variation in mothers' PTSSs prospectively predicts variation in their children's adjustment problems also holds implications for service delivery. Specifically, it would highlight the importance of treating mothers with elevated levels of PTSSs as soon as possible when they seek services for themselves or their IPV-exposed children. At present, many of the empirically supported interventions for IPV-exposed youth focus on the youth themselves or the mothers' parenting practices; that is, many do not appear to address the mothers' PTSSs or do so only indirectly (Chamberlain, 2014; Wathen & Macmillan, 2013). Conversely, it seems possible, even probable perhaps, that in families in which IPV has been severe and persistent—which is common among families seeking legal or shelter services (Jouriles et al., 1998)—changes in mothers' PTSSs will have little or no effect on the children in the family. That is, when high levels of IPV are sustained for a period of time, vulnerable children have likely already been damaged, and simply reducing mothers' PTSSs may not be enough to rectify the problems.

In the current study, we tested the hypothesis that fluctuation in mothers' PTSSs predicts fluctuation in child externalizing and internalizing problems. Specifically, as mothers' PTSSs increase or decrease, child problems are also expected to change in the same direction during the ensuing time period. In a sample of families (i.e., mother-child dyads) in which mothers had sought legal or shelter services because of IPV, families were assessed every 4 months for 5 years, for a total of 16 possible data points for each family. Assessments were spaced 4 months apart because significant changes often occur in families shortly after a traumatic event (Pine & Cohen, 2002) and frequently continue over the ensuing months and years. This is especially true for mothers and children who have sought shelter because of IPV (Jouriles et al., 2001, 2009). We tested the hypothesized associations using a statistical approach that disaggregates between- and within-subject effects of mothers' PTSSs. We hypothesized that the expected relations would emerge in both between-subjects and within-subject analyses but were especially interested in the within-subject effects. Within-subject analyses allow for a more developmentally appropriate and tightly controlled evaluation of hypothesized associations compared with the more commonly reported between-subjects analyses (Berry & Willoughby, 2017). In addition, Hamaker, Kuiper, and Grasman (2015) show that cross-lagged, within-subject effects are quasi-causal, allowing for stronger conclusions about causality and the direction of effects.

The sample in the current research included a wide age range of children; thus, we explored whether the association between mothers' PTSSs and child problems varied as a function of child age. It might be argued that very young children are likely to be strongly

affected by mothers' PTSSs because they rely heavily on their caregivers to provide them with a predictable, safe environment; therefore, if PTSSs interfere with the mothers' ability to provide their children with the necessary support to cope with and make sense of the violence, this might be especially difficult for younger children (Margolin & Gordis, 2000). Also with younger children, the close emotional relationship between the mother and child has been hypothesized to intensify symptomatology in both (Levendosky et al., 2013; Scheeringa & Zeanah, 2001). On the other hand, although older children may be less dependent on their caregivers than preschoolers, they are still reliant upon them and may be more cognizant of changes in their mothers' emotions and emotional responsiveness (Margolin & Gordis, 2000). Thus, we did not make a directional hypothesis regarding child age as a potential moderator.

Among women who seek legal or shelter services because of IPV, the IPV often continues long after the families first reach out for help (Bybee & Sullivan, 2005; McDonald, Jouriles, Rosenfield, & Corbitt-Shindler, 2011). Again, IPV is linked to both mothers' PTSSs and child adjustment problems, and it could be argued to be a cause of both; thus, IPV was controlled in all analyses evaluating relations between PTSSs and child adjustment. In addition, among women who have experienced IPV, trauma and depressive symptoms are often comorbid (Cascardi, O'Leary, & Schlee, 1999; Nixon, Resick, & Nishith, 2004; Stein & Kennedy, 2001). In fact, some investigators report very strong associations between depressive and trauma symptoms (e.g., $r = .84$; Stein & Kennedy, 2001). Thus, in exploratory analyses, we attempted to evaluate the influence of mothers' PTSSs on child adjustment after accounting for mothers' depressive symptoms. However, given the degree of comorbidity that is sometimes documented between trauma and depressive symptoms, we did not make specific hypotheses. We also explored whether relations between mothers' PTSSs and child externalizing and internalizing problems are affected by time (i.e., whether the relations become stronger or weaker over time). Short-term longitudinal studies suggest a decline in women's PTSSs symptoms following their departure from a domestic violence shelter (Johnson & Zlotnick, 2012; Mertin & Mohr, 2001), and it might be reasoned that relations between mothers' PTSSs and child externalizing and internalizing problems weaken over time as mothers' PTSSs begin to return to normal levels.

Method

Participants and Procedures

Participants were 300 women recruited from the district attorney's office ($n = 150$) in a large urban area in the United States and five domestic violence shelters ($n = 150$) in the same county of the district attorney's office. To be eligible for the study, women had to (a) speak English or Spanish, (b) have at least one child between 18 months and 16 years, and (c) qualify for residence at a domestic violence shelter or a protection order because of domestic violence. To help create a more homogenous group of women who had experienced IPV and sought either legal services or emergency shelter, all women had to be either first-time residents of a domestic violence shelter or first-time qualifying applicants for a protection order. If an eligible woman had more than one child, one child was chosen at random for data collection

purposes. The study was originally designed to assess for differences between families recruited from domestic violence shelters and the district attorney's office on a range of variables over a 5-year period, and an a priori power analysis using G*Power with $\alpha = .05$, moderate effect sizes, and power = .80, indicated that a sample size of 300 was sufficient to test for such differences (McFarlane, Nava, Gilroy, Paulson, & Maddoux, 2012); however, differences between these two groups of families were not expected in the current study. Given the design of the current study, the current sample size is sufficient to detect significant changes should they exist.

All procedures received university institutional review board approval. Participant consent was obtained prior to the baseline assessment. At baseline, most mothers identified as Hispanic (57%), followed by Black/African American (26%), White (11%), Asian (1%), Bi-/multiracial (5%), and American Indian (0.3%). Mothers were 30.65 years old ($SD = 7.64$), on average; children (49% female) were 6.88 years old ($SD = 4.23$), on average. Mothers' reported education levels were: less than high school (34%), high school/GED (19%), some college (42%), and earned a college degree (6%). A little more than half the sample (54%) indicated seeking counseling services at some point during the 5-year follow-up period, but this was a yes-no variable and it is not known why counseling services were sought (e.g., safety planning, mental health) or the type and duration of services received. Additional details about sample demographics and recruitment methods are provided in McFarlane et al. (2012).

The baseline assessment occurred within 48 hr of mothers' initial contact with the domestic violence shelter or the district attorney's office. Women who sought shelter did not differ from those who sought legal services on measured demographic variables, with the exception that those seeking shelter were less likely to be high school graduates. Specifically, 60% of the sheltered women and 73% of the women seeking a protection order had graduated from high school, $\chi^2(3) = 10.28$, $p = .016$, Cramer's $V = .185$. After the baseline assessment, women were scheduled to participate in assessments every 4 months for a 5-year period, for a possible total of 16 assessments. Women received cash compensation for completing the assessments. Specifically, women received \$30 for the first assessment, \$40 for the second, \$50 for the third, \$60 for the fourth, and \$70 for all remaining assessments.

Doctoral-level registered nurses ($n = 3$) completed the assessments. Each had significant experience (at least 2 years) working with women who have experienced IPV, and each followed a safety and retention protocol during the assessments (McFarlane, 2007). Assessment measures were administered verbally, in the mother's preferred language (English or Spanish), at a time and location that was safe and convenient for the mothers. The majority of participants completed the survey in English ($n = 217$; 72%). Prior to the start of the study, measures were translated from English to Spanish by a native Spanish speaker and then were back-translated to English by a native English speaker. Internal consistency coefficients were similar across the English and Spanish versions of the measures, and there were no differences at baseline on measured demographics (with the exception of ethnicity) or study variables between participants who completed the measures in English and Spanish.

At 5 years, 276 mothers (92%) had completed all study measures at each of the 16 assessment points. Among the 24 mothers

without complete data, eight had withdrawn from the study, 15 were lost to follow-up, and one had died. Data that were available for these 24 mother-child dyads were used in analyses. There were no differences in demographic or study variables between the 276 mothers who had participated in each of the 16 assessments and the 24 mothers who had not ($ps > .05$), but a greater proportion of women who did not complete all 16 assessment points were recruited from shelters compared with the district attorney's office, $\chi^2(1) = 4.91, p = .027$.

Measures

All measures used in this study were collected at all 16 time points.

Mothers' PTSSs. Mothers reported PTSSs over the previous 4 months on a 7-item screening scale for *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) posttraumatic stress disorder (Breslau, Peterson, Kessler, & Schultz, 1999). Mothers responded to items by indicating either "yes" or "no," and items (0 = no, 1 = yes) were summed to yield a PTSSs score with a possible range of 0 to 7. This scale has concurrent validity with a full diagnostic interview in clinical (Kimerling et al., 2006) and community (Bohnert & Breslau, 2011; Breslau et al., 1999) samples. Coefficient alpha in the present sample ranged from .70 to .79 across the 16 assessments.

Children's externalizing and internalizing problems. Mothers reported on child externalizing and internalizing problems over the previous 4 months on the Child Behavior Checklist (CBCL), Age 1.5 to 5 years and Age 6 to 18 years (Achenbach & Rescorla, 2000). Mothers indicated the extent of child problems on a 3-point scale (0 = not true, 1 = somewhat or sometimes true, and 2 = very true or often true). *T* scores were used in analyses. The CBCL is widely used in research on child psychopathology, and the concurrent validity of mothers' reports with other reporters and measures of child problems is well documented for both the externalizing and internalizing problem scales (Achenbach & Rescorla, 2000). Coefficient alpha in the present sample ranged from .69 to .86 for externalizing problems and .81 to .92 for internalizing problems across the 16 assessments.

Mothers' depressive symptoms. Mothers completed the 6-item depression scale of the Brief Symptom Inventory (BSI; Derogatis & Lazarus, 2001). The reporting period was the past 7 days. Mothers indicated the extent of depressive symptoms on a 5-point scale (0 = not at all, 1 = a little bit, 2 = moderately, 3 = quite a bit, 4 = extremely), and item scores were summed to yield a depressive symptoms score with a possible range of 0 to 24 at each assessment. The BSI depression scale has concurrent validity with other measures of depressive symptoms (Meachen, Hanks, Millis, & Rapport, 2008). Coefficient alpha in the present sample ranged from .82 to .90 across the 16 assessments.

Physical IPV. Mothers completed the 21-item physical assault subscale of the Severity of Violence against Women Scale (SVAWS; Marshall, 1992) to indicate the extent of physical IPV victimization over the previous 4 months. Responses were made on a 4-point scale (0 = never, 1 = once, 2 = 2-3 times, 3 = 4 or more times), and item scores were summed to yield a physical IPV score. The SVAWS correlates positively with other commonly used measures of IPV, such as the Conflict Tactics Scale (Leven-

dosky & Graham-Bermann, 2000). Coefficient alpha in the present sample ranged from .82 to .96 across the 16 assessments. However, because the scores were substantially skewed and there were many zeros (i.e., 85% across the 16 assessments), IPV was dichotomized (0 = never, 1 = one or more times) in analyses.

Data Analysis

Multilevel modeling (MLM) was used to analyze the data. MLM allows inclusion of all participants, regardless of missing data, which increases power and generalizability. Assessments were nested within participants, and maximum likelihood estimation was used. Because incorrect specification of the error covariance matrix can produce inaccurate results (Liu, Rovine, & Molenaar, 2012), we examined multiple alternative error covariance matrices (autoregressive heterogeneous, autoregressive homogeneous, compound symmetry heterogeneous, compound symmetry homogeneous, diagonal, and scaled identity) in order to determine the matrix that best fit the data. Because the autoregressive covariance matrix with heterogeneous variances fit the data significantly better than any other error covariance matrix, it was used in all analyses. Satterthwaite approximation (Satterthwaite, 1946) was used for calculating degrees of freedom for significance tests for regression coefficients. No random effects were included in the final models because the models using the autoregressive matrix with heterogeneous variances would not converge when random effects were included. A model that does not include any random effects is often referred to as a *covariance pattern model*. All analyses were conducted using SPSS v.24.

A cross-lagged panel model is often used to study quasi-causal influences in longitudinal panel data (Hamaker et al., 2015); therefore, we used this approach in all analyses. However, results for time-varying predictors (TVPs) in longitudinal models can be inaccurately estimated, as TVPs conflate between-subjects effects and within-subject effects (Hedeker & Gibbons, 2006). For example, a mother may have a high score on PTSSs at a particular assessment in part because she generally reports high PTSSs (a between-subjects difference) and/or because she is experiencing higher than her normal PTSSs at that particular time point (a within-subject effect). Recent research shows that erroneous conclusions can be made when between- and within-subject effects are not separated in cross-lagged models (Hamaker et al., 2015). Therefore, each TVP in our model was disaggregated into between- and within-subject effects using the following formula, illustrated here for PTSSs (Hedeker & Gibbons, 2006):

$$PTSS_{sij} = PTSS_{smean_i} + PTSS_{sdeviations_{ij}}$$

$PTSS_{sij}$ is the PTSSs score for participant *i* at assessment *j*, $PTSS_{smean_i}$ is the mean PTSSs score for participant *i* across all assessments for participant *i*, and $PTSS_{sdeviations_{ij}}$ is the difference between a participant's PTSSs score at assessment *j* and that participant's mean PTSSs score (i.e., the difference between PTSSs at assessment *j* and the mean of PTSSs averaged across all assessments for that participant). These two components of PTSSs, $PTSS_{smean_i}$ and $PTSS_{sdeviations_{ij}}$ were included as separate predictors in all cross-lag analyses.

Our cross-lag model examined the relation between mothers' PTSSs (at assessment *j*-1) and children's adjustment problems 4 months later (at assessment *j*) across the 5-year period. Child

externalizing and internalizing problems were examined in separate models, with IPV and the respective child problem variable at assessment $j-1$ included as control variables (see an example of the statistical model below which illustrates the equation for externalizing problems). Furthermore, child problems at assessment $j-1$ was disaggregated into between and within effects (Hamaker et al., 2015). In initial analyses, mothers' age, education, and ethnicity, child sex, shelter status, days spent at shelter, and mothers' use of counseling services during the follow-up period were also included as control variables (covariates) but were dropped from subsequent analyses because they did not predict children's adjustment. The final cross-lag model for externalizing problems was

$$\begin{aligned} \text{Externalizing}_{ij} = & b_0 + b_1 * \text{PTSSsmean}_i \\ & + b_2 * \text{PTSSsdeviations}_{ij-1} \\ & + b_3 * \text{Externalizingmean}_i \\ & + b_4 * \text{Externalizingdeviations}_{ij-1} + b_5 * \text{IPV}_{ij-1} \\ & + \epsilon_{ij}, \end{aligned}$$

where "mean" is the average value of mothers' PTSSs or externalizing problems for participant i across all assessments, and "deviations" is the deviation from the mean at each assessment j for participant i . Significant mean effects indicate a between-subjects covariation between the predictor and the outcome (e.g., mothers with higher average PTSSs scores have children with higher than average externalizing problems). Significant lagged deviation effects indicate a within-subject, quasi-causal relation between the predictor and outcome (Hamaker et al., 2015; e.g., when mothers have higher than their average PTSSs scores, their children have higher than average externalizing problems at the next assessment). PTSSs, internalizing problems, and externalizing problems were all centered at their grand mean before disaggregating. IPV was not recentered (0 = no IPV, 1 = any reported IPV).

In exploratory analyses to examine whether child age moderated the cross-lag relations between mothers' PTSSs and child externalizing or internalizing problems, child age and its interaction with mothers' PTSSs (means and deviations) were added as additional predictors to the basic cross-lag models. Child age was centered at its grand mean for the initial test of moderation. In the case of a significant moderating effect, child age was recentered alternately at one standard deviation above the mean and one standard deviation below the mean to examine the nature of the moderating effect. To explore whether fluctuation in mothers' PTSSs predicted child adjustment problems while controlling for mothers' depressive symptoms, mothers' depressive symptoms were included as a Level 1 time-varying covariate to the basic models. Finally, to explore whether relations between mothers' PTSSs and child problems were affected by time (e.g., whether the relations become stronger or weaker over time and remain significant controlling for time), time and its interaction with mothers' PTSSs were added to the basic model. Because the effects of time might not be linear, we also added a quadratic term for time and its interaction with PTSSs.

There are no generally accepted effect size measures for continuous predictors in MLMs (Feingold, 2013; Singer & Willett, 2003), in part because it is possible that the addition of variables to these models can add "negative variance" to the model (Snijders

& Bosker, 1999). Despite the unpredictable meaning of effect size measures in these models, we provide Cohen's f^2 , which is a measure of local effect size in MLM (Selya, Rose, Dierker, Hedecker, & Mermelstein, 2012).

Results

Descriptive Analyses and Preliminary Analyses

Table 1 displays the means and standard deviations for the study variables at each assessment. Of the 300 mothers who participated at baseline, clinical levels of PTSSs (scores ≥ 4) were reported by 81% at baseline, 38% at 1 year, 32% at 2 years, 29% at 3 years, 26% at 4 years, and 27% at 5 years. Among the children, clinical levels of externalizing problems (T scores > 70) were reported for 26% at baseline, 20% at 1 year, 17% at 2 years, 12% at 3 years, 14% at 4 years, and 12% at 5 years. For clinical levels of internalizing problems, the proportions were 31% at baseline, 18% at 1 year, 16% at 2 years, 16% at 3 years, 14% at 4 years, and 13% at 5 years. Physical IPV was reported to have occurred in the past 4 months by 84% of the women at baseline. However, the proportion of women who continued to experience physical IPV dropped substantially over time. Specifically, 5% of the women reported physical IPV at 1 year, 7% at 2 years, 4% at 3 years, 2% at 4 years, and 1% at 5 years. IPV (as a time-varying predictor) was controlled in all analyses evaluating relations between PTSSs and child adjustment.

Our models assume data are missing at random. Although one cannot prove this assumption, data can be examined to evaluate whether the data are consistent with this assumption. Participants with missing data did not differ from those with complete data on any of the baseline variables except recruitment source ($p = .027$), which is consistent with the assumption that data are missing at random. A pattern mixture model (e.g., Enders, 2011), which examines whether the growth curve for those with missing data differs from the growth curve for those with complete data, was performed as a second test of the assumption. For the pattern mixture model, each mother-child dyad was coded as either having missing data (coded = 0) or no missing data (coded = 1). This missing data variable was added to the models, along with its interaction with mothers' PTSSs (means and deviations). Pattern mixture models indicated that the relation between mothers' PTSSs and child externalizing and internalizing problems did not differ between those with missing data and those without missing data ($ps > .274$), which is consistent with the assumption that data are missing at random.

Hypothesis Tests

Table 2 presents the results for our hypothesis tests. In cross-lag analyses predicting child adjustment problems, results indicated that mothers' mean level of PTSSs across all assessments was not associated with child externalizing problems, $b < 0.01$, $t(412) = 0.06$, $p = .953$, 95% confidence interval [CI] $[-0.14, 0.15]$, or internalizing problems, $b = 0.05$, $t(276) = 0.56$, $p = .576$, 95% CI $[-0.13, 0.23]$. However, mothers' deviations from their average levels of PTSSs were positively associated with child externalizing as well as internalizing problems at the subsequent assessment after controlling for child problems at the previous assessment

Table 1
Means and Standard Deviations of Study Variables Across Assessments

Variable	Assessment month															
	0	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
PTSS	5.1 (1.8)	3.4 (2.1)	3.1 (1.9)	3.0 (2.0)	2.7 (2.0)	2.7 (2.1)	2.7 (2.0)	2.6 (2.0)	2.4 (2.1)	2.4 (2.1)	2.4 (2.0)	2.3 (2.1)	2.4 (2.1)	2.3 (2.0)	2.4 (2.1)	2.4 (2.2)
Externalizing	56.1 (12.0)	54.5 (12.4)	54.0 (12.7)	53.1 (12.2)	53.2 (12.3)	53.1 (12.6)	52.7 (12.6)	52.5 (11.9)	52.5 (11.3)	52.1 (11.9)	51.9 (11.9)	52.2 (11.5)	51.2 (11.6)	51.3 (11.7)	51.2 (11.3)	50.8 (11.5)
Internalizing	56.7 (11.7)	54.0 (11.6)	52.9 (11.9)	51.7 (12.2)	51.7 (12.4)	51.3 (12.7)	52.0 (12.0)	51.5 (12.6)	51.3 (12.4)	50.7 (12.2)	50.5 (11.6)	50.8 (11.7)	50.0 (11.9)	51.3 (11.7)	51.1 (11.4)	50.2 (11.8)

Note. Means are for participants for whom data was available at each assessment. PTSS raw scores and externalizing and internalizing *T* scores are reported. PTSS = posttraumatic stress symptoms measured by the Post-Traumatic Stress Disorder scale; Externalizing and Internalizing = child externalizing and internalizing problems measured by the Child Behavior Checklist.

(externalizing problems: $b = 0.19$, $t[2577] = 2.72$, $p = .007$, 95% CI [0.05, 0.33], $f^2 = 0.001$; internalizing problems: $b = 0.17$, $t[2887] = 2.36$, $p = .019$, 95% CI [0.03, 0.32], $f^2 = 0.003$). When mothers' PTSSs were higher than their average level of PTSSs, their children tended to have higher levels of externalizing and internalizing problems at the subsequent assessment. Similarly, when mothers' PTSSs were lower than their average level of PTSSs, their children tended to have lower levels of externalizing and internalizing problems at the subsequent assessment.

Exploratory Analyses

Child age as moderator. On average, children were 6.88 ($SD = 4.23$) years old at baseline. In the analyses adding child age as a moderator of the relation between PTSSs and child problems, child age did not moderate the relation between mothers' mean levels of PTSSs and child externalizing or internalizing problems ($ps > .585$). However, child age did moderate the relation between mothers' deviation from their average level of PTSSs and subsequent child externalizing problems, $b = 0.03$, $t(1852) = 2.22$, $p = .027$, 95% CI [<0.01 , 0.06], $f^2 = 0.001$, and internalizing problems, $b = .04$, $t(1813) = 2.73$, $p = .006$, 95% CI [0.01, 0.07], $f^2 = 0.002$.

One commonly used method to understand the nature of a moderator effect (child age) is to calculate the "simple slope" between the predictor (PTSSs) and outcome (child problems) at higher (i.e., +1 *SD* from the mean) and lower (i.e., -1 *SD* from the mean) levels of the moderator variable (e.g., Cohen, Cohen, West, & Aiken, 2003; Hayes, 2013). This simple slope method uses the entire sample to estimate the relation between PTSSs and child problems at specific values of child age. We therefore estimated the simple slopes for the relation between deviations of mothers' PTSSs and subsequent child externalizing and internalizing problems at higher (i.e., +1 *SD* from mean, or 11.11 years old) and lower (i.e., -1 *SD* from mean, or 2.65 years old) child ages. For younger children, there was no relation between mothers' PTSS deviation scores and child problems (externalizing problems: $b = 0.04$, $t[-2496] = 0.44$, $p = .661$, 95% CI [-0.15, 0.24]; internalizing problems: $b = -0.01$, $t[-2611] = -0.08$, $p = .934$, 95% CI [-0.21, 0.19]). But for older children, the relation between mothers' PTSS deviation scores and child problems at the next assessment was positive (externalizing problems: $b = 0.33$, $t[2045] = 3.52$, $p < .001$, 95% CI [0.15, 0.52], $f^2 = 0.001$; internalizing problems: $b = 0.35$, $t[2205] = 3.60$, $p < .001$, 95% CI [0.16, 0.54], $f^2 = 0.006$). Specifically, for older children, when mothers had higher than their average level of PTSSs, children had higher levels of externalizing and internalizing problems at the subsequent assessment. Similarly, for older children, when mothers had lower than their average levels of PTSSs, children had lower levels of externalizing and internalizing problems at the subsequent assessment.

Mothers' depressive symptoms as a time-varying covariate. The correlation between mothers' PTSSs and depressive symptoms at each of the 16 assessment points ranged from $r = .44$ to $.59$ ($ps < .001$). When mothers' depressive symptoms were added as a time-varying covariate to the MLM cross-lag analyses predicting child adjustment problems, the pattern of findings for the hypothesis tests did not change. Similarly, when mothers' depressive symptoms was added as a time-varying covariate to the

Table 2
Prospective Relations of Mothers' PTSSs to Children's Externalizing and Internalizing Problems

Variable	Externalizing			Internalizing		
	<i>b</i> (<i>SE</i>)	<i>t</i>	<i>p</i>	<i>b</i> (<i>SE</i>)	<i>t</i>	<i>p</i>
Intercept	52.45 (.11)	465.00	<.001	51.33 (.12)	410.93	<.001
Mothers' PTSSs (means)	<.01 (.08)	0.06	.953	0.05 (.09)	0.56	.576
Mothers' PTSSs (deviations) _{j-1}	0.19 (.07)	2.72	.007	0.17 (.07)	2.36	.019
Children's problems (means)	1.05 (.01)	88.19	<.001	1.05 (.01)	74.16	<.001
Children's problems (deviations) _{j-1}	0.28 (.01)	19.42	<.001	0.19 (.01)	12.53	<.001
Physical IPV _{j-1}	0.57 (.36)	1.61	.108	1.24 (.36)	3.50	<.001

Note. Children's problems used in each model correspond to the type of children's problems examined as the outcome (e.g., prior externalizing problems were included as a covariate in models predicting later externalizing problems and vice versa). *SE* = standard error; PTSSs = posttraumatic stress symptoms; *j* = assessment; IPV = intimate partner violence.

moderator analysis previously performed, the moderator findings did not change.

Time as a moderator. Time (both as a linear term and a quadratic term) was added as a moderator of the relation between mothers' PTSSs scores and child problems. The quadratic term for time was not a moderator of the effect of PTSSs on child externalizing problems or internalizing problems ($ps \geq .144$), nor was it a predictor of child externalizing or internalizing problems ($ps \geq .238$). Thus, the quadratic term for time was dropped from the model, and the analyses were recomputed. In this trimmed analysis, linear time did not moderate the effect of mothers' mean levels of PTSSs on child externalizing or internalizing problems ($ps \geq .119$); therefore, this interaction was dropped and the model recomputed. In this final exploratory model, linear time did moderate the relation between mothers' deviation from their average level of PTSSs and subsequent child externalizing problems, $b = -0.05$, $t(2324) = -2.96$, $p = .003$, 95% CI [-0.08, -0.02], $f^2 < 0.001$, and internalizing problems, $b = -0.03$, $t(1751) = -2.08$, $p = .038$, 95% CI [-0.06, -0.01], $f^2 < 0.001$.

To understand the nature of this moderating effect, we calculated the relation between deviations in mothers' PTSSs and subsequent child externalizing and internalizing problems at relevant time points within the study time frame (at 1, 2, 3, and 4 years). At the 1-year assessment, mothers' PTSSs were positively related to subsequent child externalizing problems, $b = 0.27$, $t(1922) = 2.64$, $p = .008$, 95% CI [0.07, 0.46], $f^2 = 0.001$. However, this relation weakened as time passed, and was not significant at the 2-year, 3-year, or 4-year assessments ($ps > .09$). For child internalizing problems, mothers' PTSSs related to subsequent child internalizing problems at both the 1-year and 2-year assessments (1-year assessment: $b = 0.26$, $t[1401] = 2.56$, $p = .011$, 95% CI [0.06, 0.45], $f^2 = 0.001$; 2-year assessment: $b = 0.16$, $t[2760] = 2.05$, $p = .040$, 95% CI [0.01, 0.31], $f^2 < 0.001$). At subsequent assessments, mothers' PTSSs were not related to subsequent child internalizing problems ($ps > .44$).

Discussion

Our results indicated that many of the women in our sample who were seeking safety from IPV—either at a domestic violence shelter or by obtaining a protection order—initially reported clinical levels of PTSSs (81%). In addition, although the proportion of women reporting PTSSs dropped over time, over 25% of the women reported clinical levels of PTSSs 3 to 5 years later. These

data are consistent with other research indicating that PTSSs are common sequelae of IPV (Ehrensaft et al., 2006; Golding, 1999) and trauma symptoms that are a consequence of IPV often decline over time (Johnson & Zlotnick, 2012; Mertin & Mohr, 2001). The current findings, however, extend prior research by documenting that for many women, clinical levels of PTSSs are present for as long as 5 years after initially seeking help for IPV. Thus, although PTSSs decline for some women, it certainly does not decline for everyone. It is also noteworthy that a substantial proportion of the children in these families exhibit clinical levels of externalizing (26%) and internalizing (31%) problems, many for long after their mothers first sought help. These findings are consistent with those of researchers who work with children in families seeking help because of IPV (Graham-Bermann, Lynch, Banyard, Devoe, & Halabu, 2007; Jouriles et al., 2001, 2009), and they extend prior research by documenting that clinical levels of child problems are sustained up to 5 years after the mothers initially sought help for at least 12% to 13% of the families.

The current study presents the first longitudinal, within-subject analysis of the association between mothers' PTSSs and child externalizing and internalizing problems in a sample of families seeking help for IPV. As hypothesized, fluctuation in mothers' PTSSs predicted a corresponding fluctuation in child externalizing and internalizing problems during the ensuing 4-month period, but these relations emerged only for within-subject, and not between-subjects, relations. In addition, the within-subject associations between mothers' PTSSs and child externalizing and internalizing problems emerged even after accounting for mothers' depressive symptoms as well as several other contextual variables (e.g., IPV and the utilization of counseling services during the follow-up period) that might influence mothers' PTSSs, child adjustment, or both. These associations were stronger for older, compared with younger, children, and the associations between PTSSs and child adjustment dissipated with time. The longitudinal, within-subject analyses provide the strongest evidence, to date, that PTSSs experienced by mothers seeking services for IPV adversely affect their children, as family systems and developmental theories suggest (Chemtob et al., 2010; Levendosky & Graham-Bermann, 2000; Scheeringa & Zeanah, 2001). The current research also provides a more nuanced picture of the association between mothers' PTSSs and child adjustment than what is possible with cross-sectional and short-term longitudinal studies—demonstrating that

fluctuation in mothers' PTSSs predicts fluctuation in child externalizing and internalizing problems for the first year or two after mothers sought services, but the strength of the association decreases over time.

From a clinical perspective, these findings highlight the potential importance of early screening for trauma symptoms among women seeking services for IPV and repeated screenings for trauma symptoms over time, if at all possible. Such screenings should also occur among women seeking services for their IPV-exposed children. Again, most of the women in this sample experienced significant PTSSs at the baseline assessment, and, on average, their PTSSs declined over time, as did the strength of the relation between their PTSSs and child adjustment problems. During the 2-year period after initially seeking shelter or a protective order because of IPV, fluctuation in mothers' PTSSs predicted fluctuation in child problems. Early detection and effective intervention for significant PTSSs has the potential to ameliorate mothers' suffering more quickly (that is, more quickly than simply waiting for the mothers' trauma symptoms to pass with time) and to circumvent other types of problems, such as child difficulties. Early detection of increases in mothers' PTSSs over time might be especially useful and important for help-seeking women and their children.

Clinical services have already been developed and evaluated for women who are experiencing significant trauma symptoms as a consequence of IPV—to help them overcome PTSSs that may have been caused by the violence (e.g., [Graham-Bermann & Miller, 2013](#); [Johnson, Zlotnick, & Perez, 2011](#); [Kubany et al., 2004](#)). The provision of such services should be considered by agencies that offer help to women who have experienced IPV. Importantly, women who have experienced recent IPV may have difficulty accessing and engaging in clinical services to mitigate their trauma symptoms ([Iverson, Resick, Suvak, Walling, & Taft, 2011](#)). Thus, simply offering empirically supported services for PTSSs may not be enough; rather, it might be necessary for agencies to work with women who are in violent relationships to enhance their ability to begin such treatment.

Interestingly, many of the empirically supported interventions that focus on IPV-exposed youth focus on the youth themselves or the mothers' parenting practices; if mothers' PTSSs are addressed, it is done so only indirectly ([Chamberlain, 2014](#); [Wathen & Macmillan, 2013](#)). The current findings highlight the possible benefits these youth-focused programs might accrue by also addressing mothers' PTSSs specifically. Indeed, it is possible that effectively reducing mothers' PTSSs will improve children's functioning and circumvent the need for offering intensive youth-focused services. On the other hand, IPV often co-occurs with other risk factors for child problems, and some of these risk factors are likely to be independent of mothers' PTSSs, such as harsh parenting and child maltreatment by the mother's partner ([McDonald et al., 2011](#)). In addition, children's witnessing of IPV can result in fears and cognitions that contribute to their adjustment difficulties ([Davies, Martin, Coe, & Cummings, 2016](#); [Grych, Fincham, Jouriles, & McDonald, 2000](#); [Jouriles, Vu, McDonald, & Rosenfield, 2014](#)), and these fears and cognitions may not dissipate with the alleviation of mothers' PTSSs. In short, effectively reducing mothers' PTSSs might help improve child functioning, but research evaluating this specific hypothesis has not yet been conducted.

The current study was not designed to explain the prospective associations between mothers' PTSSs and child externalizing and internalizing problems. However, the literature points to a number of hypotheses. Literature reviews indicate that mothers' PTSSs relate positively to intrusive, hostile, and controlling parenting styles by the mother ([van Ee, Kleber, & Jongmans, 2016](#))—parenting styles that are consistently linked to child externalizing and internalizing problems ([Gershoff & Grogan-Kaylor, 2016](#)). To the extent that mothers' PTSSs actually cause intrusive, hostile, and controlling mother-child interactions, it might also be causing child problems. In addition, children who observe their mothers display certain types of trauma symptoms, such as outbursts of anger and exaggerated irritability in response to innocuous events, may become socialized to behave similarly ([Samuelson, Wilson, Padrón, Lee, & Gavron, 2017](#)). The literature on children's exposure to interparental conflict and violence suggests many possible cognitive and emotional mediators that might also be a factor in these families (see [Jouriles, McDonald, & Kourros, 2016](#), for a review). Prominent among these are children's feelings of threat and emotional security, which have been highlighted in theory ([Davies & Cummings, 1994](#); [Grych & Fincham, 1990](#)) and research on conflictual and violent families (e.g., [Davies et al., 2016](#); [Grych et al., 2000](#); [Jouriles et al., 2014](#)). It is plausible that these feelings are heightened in violent families when the mothers are experiencing trauma symptoms.

In addition, the current study does not explain the moderating effect for child age. Older children might be hypothesized to be more aware of their mothers' emotions and emotional reactions than their younger counterparts ([Margolin & Gordis, 2000](#)), which might help explain the observed moderator effects. It is also possible that older children are more aware of the implications of their mothers' trauma symptoms and how these symptoms might interfere with individual wishes (e.g., being able to invite a friend over to play) and affect the family (e.g., mother will yell at me because she is in an irritable mood). This moderator effect is interesting, because it is sometimes thought that younger, compared with older, children are more vulnerable to the influences of violent home environments and their sequelae ([Margolin & Gordis, 2000](#)). It is important to emphasize, however, that the moderating effect of child age, although interesting, was not predicted. Thus, replication of this finding will be especially important.

In contrast to our hypothesis, associations between mothers' PTSSs and child externalizing and internalizing problems did not emerge in between-subjects analyses. Because the mother-child dyads serve as their own control in within-subject analyses, allowing investigators to rule out possible confounds from unmeasured third variables, analyses of within-subject changes are more sensitive than those of between-subjects differences ([Bolger & Laurenceau, 2013](#)). However, a limitation of the absence of between-subjects effects is that generalizations about problematic levels of PTSSs, with respect to child functioning, cannot easily be made from these data.

The current study has a number of methodological strengths. These include the sample size, the 5-year longitudinal design with frequent measurements of mother and child functioning, and minimal missing data, as well as the within-subject analysis and lagged approach to analyses. Nonetheless, several limitations should also be noted. First, this study focused on mothers' PTSSs as a predictor of child adjustment problems. Trauma symptoms, however, are

often comorbid with other psychiatric symptoms among women who have experienced IPV (Ehrensaft et al., 2006). We controlled for mothers' depressive symptoms but cannot rule out the possibility that other mental health problems, such as substance abuse, might be responsible for the observed associations. Second, we controlled for IPV as a potential third variable accounting for associations between mothers' PTSSs and child adjustment problems, but it is still possible that other third variables influenced and partially accounted for the documented associations. This might include other family stressors (e.g., financial) and the presence or absence of a supportive social network. It might also include factors that have been directly linked to child functioning in families characterized by IPV, such as parental aggression toward children (Jouriles et al., 2008) and children's cognitions about the family and its future (Davies et al., 2016; Grych et al., 2000; Jouriles et al., 2014). Third, most of the mothers in the current sample identified as either Hispanic or Black/African American (83%), and these two minority groups tend to experience a greater number of stressors than Whites (Williams, 2000). In fact, minority women may experience unique stressors that are connected with their experiences of IPV, such as racial discrimination from law enforcement personnel, which can undermine their ability to cope adaptively with the IPV and resulting trauma symptoms (DePrince, Zurbriggen, Chu, & Smart, 2010). Given the likely presence of additional stressors that may be unique to the current sample, it is not clear how the current findings generalize to primarily White samples or samples of different minority groups.

Several other methodological limitations should also be acknowledged. Data on both mothers' trauma symptoms and child adjustment problems were obtained via mothers' reports. It is possible that mothers' trauma symptoms biased their future reports of child adjustment, although data on this are mixed; in fact, if a bias exists, it is possible that mothers with significant trauma symptoms underreport their children's problems as opposed to overreport them (Chemtob & Carlson, 2004; Cohodes, Hagan, Narayan, & Lieberman, 2016). Nevertheless, a convergence of results across data on child functioning collected via different methods would provide increased confidence in the current findings. Also, the conclusions from this study would have been stronger and more meaningful if the design included an equivalent sample of non-IPV-exposed mothers and children in order to conduct between-groups comparisons. Finally, the effect sizes for most of the significant effects were very small. Unfortunately, in MLM models, the addition of variables to a model can even lead to negative changes in explained variance, especially when a Level 1 predictor does not vary at Level 2, which is a characteristic of deviation scores like those used in our models (Roberts, Monaco, Stovall, & Foster, 2011). Thus, the interpretation of the obtained effect sizes remains unclear.

Despite these limitations, findings from this study provide evidence that changes in mothers' PTSSs relate to changes in child adjustment problems. As such, these findings suggest that reductions in mothers' PTSSs can have positive effects for children as well as their mothers. Empirically supported interventions for IPV-exposed youth might be enhanced by also addressing mothers' PTSSs. Given the potentially devastating consequences of IPV for both mothers and children, interventions that have demonstrable positive effects on both mothers' PTSSs and child adjustment would be particularly desirable.

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